(40)

No. 22O105 ORG
Title: Kansas, Plaintiff
v.
Colorado
Docketed: December 16, 1985

~~Date~~~	~~~~~~~~Proceedings and Orders~~~~~~~~
Dec 16 1985	Motion for leave to file a bill of complaint filed.
Feb 14 1986	Colorado's Brief in opposition to Motion for Leave to file Complaint filed.
Feb 19 1986	DISTRIBUTED for Conference of March 7, 1986 (Motion for leave to file Bill of Complaint filed)..
Mar 3 1986	Motion for injunctive relief or an order to compel defendant to comply with Arkansas River Compact.
Mar 3 1986	Reply brief filed by plaintiff. (Also brief in support of above motion).
Mar 5 1986	DISTRIBUTED for Conference of March 21, 1986..
Mar 13 1986	Opposition filed by Colorado.
Mar 18 1986	Reply brief filed by Kansas.
Mar 24 1986	The motion for leave to file a Bill of Complaint is GRANTED. Defendant is allowed 60 days within which to file an answer.
May 22 1986	Answer to complaint, counterclaim, and motion for appointment of Special Master received.
May 27 1986	DISTRIBUTED for Conference of June 12, 1986..
Jun 11 1986	Kansas's reply to counterclaim filed.
Jun 13 1986	REDISTRIBUTED for Conference of June 19, 1986. (Answer to complaint, counterclaim and motion for appointment of Special Master.).
Jul 7 1986	Ordered that the Hon. Wade H. McCree, Jr., of Ann Arbor, Michigan, is appointed as Special Master.
Jul 21 1986	Oath of Special Master received.
Oct 19 1987	It is ordered that Arthur L. Littleworth, Esquire, of Riverside, California, be appointed Special Master in place of Hon. Wade H. McCree, Jr., deceased. The Special Master shall have the authority to fix the time and conditions for the filing of additional pleadings and authority to summon witnesses, issue subpoenas, and take such evidence as may be introduced and such as he may deem it necessary to call for. The Special Master is directed to submit such reports as he may deem appropriate. The compensation paid to his legal, technical, stenographic, and clerical assistants, the cost of printing his report, and all other proper expenses, including travel expenses,shall be charged against and be borne by the parties in such proportion as the court may hereafter direct.
Nov 2 1987	Oath of the Special Master.
Feb 29 1988	Joint motion for approval of expenses filed. (NP).
Feb 29 1988	DISTRIBUTED for Conference of March 4, 1988. (Joint motion for approval of expenses)..
Mar 7 1988	The joint motion for approval of expenses incurred by Special Master Wade H. McCree, Jr., deceased, is GRANTED and the allocation set forth in the motion is approved.
Nov 23 1988	Motion of Special Master for interim fees and expenses filed.
Nov 25 1988	Response to above motion filed by Kansas.

Nov 25 1988 Response to above motion filed by Colorado.

Nov 28 1988 DISTRIBUTED for Conference of Dec. 2, 1988. (Motion of Special Master for interim fees and expenses)..

Dec 5 1988 The Motion of the Special Master for award of interim fees and expenses is GRANTED and the allocation set forth in the motion is approved. This amount is to be paid equally by the parties.

Jan 28 1989 Motion to refer to Special Master motion for leave to amend complaint is filed.

Feb 1 1989 DISTRIBUTED for Conference of Feb. 17, 1989. (Above Motion)..

Feb 21 1989 The Motion to refer to the Special Master the Motion for leave to amend to complaint is GRANTED.

Nov 13 1989 Motion of Special Master for interim fees and expenses filed.

Nov 13 1989 First Amended Complaint filed.

Nov 15 1989 DISTRIBUTED for Conference of Dec. 1, 1989. (Motion of Special Master for interim fees and expenses and also First Amended Complaint)..

Nov 25 1989 Consent thereto filed by Colorado. (D).

Dec 4 1989 The motion of the Special Master for award of interim fees and expenses is GRANTED and the Special Master is awarded a total of $83,082.76 to be paid by Kansas, Colorado and the United States pursuant to the allocation order filed by the Special Master on Oct. 9, 1989.

Dec 13 1989 Colorado's answer to the First Amended Complaint and Counterclaim filed.

Oct 12 1990 Motion of the Special Master for intrim fees and expenses filed.

Oct 15 1990 DISTRIBUTED for Conference of Oct. 26, 1990..

Oct 29 1990 The motion of the Special Master for interim fees and expenses is GRANTED and the Special Master is awarded $75,973.75 for the period November 1, 1989 through September 16, 1990, to be paid by the parties as follows: 40% by Kansas, 40% by Colorado and 20% by the United States. Opinion by Justice Blackmun respecting award of fees and expenses.

Jun 27 1991 Motion of the Special Master for interim fees and expenses.

Jul 30 1991 Response by Colorado filed.

Aug 5 1991 Response by Kansas filed.

Nov 4 1991 Further information requested of the Special Master by the Court.

Dec 6 1991 Further information filed by Special Master.

Jan 13 1992 Motion of the Special Master for Interim Fees and Expenses is GRANTED and the Special Master is awarded $429.457.39 to be paid in accordance with the order of Oct. 9, 1989. Justice Thomas took no part in the consideration or decision of this case.

Jun 30 1992 Motion of the Special Master for Interim fees and expenses filed.

Oct 5 1992 The motion of the Special Master for award of interim fees and reimbursements of expenses is GRANTED and the Special Master is awarded a total of $244,063.47 to be paid as follows 40% by Kansas, 40% by Colorado and 20% by the United States.

Apr 19 1993 Motion of Special Master for award of compensation and expenses (period of June 22 - Feb. 28, 1993).

Apr 19 1993 DISTRIBUTED for Conference of April 23, 1993 (above motion).

Apr 26 1993 ORDER: The motion of the Special Master for award of interim fees and reimbursement of expenses for the period of June 22, 1992 through February 28, 1993 is GRANTED and the Special Master is awarded a total of $153,042.26 to be paid as follows: 40% by Kansas, 40% by Colorado and 20% by the United States.

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Feb 22 1994 Motion of Special Master for Interim Fees and Expenses filed.

Mar 7 1994 ORDER: The motion of the Special Master for interim fees and reimbursement of expenses for the period March 1, 1993 through February 7, 1994 is granted and the Special Master is awarded a total of $202,934.15 to be paid as follows: 40% by Kansas, 40% by Colorado and 20% by the United States.

Jul 29 1994 Report of Special Master (3 volumes) and Appendix received.

Aug 3 1994 Report of Special Master distributed. September 26, 1994.

Aug 5 1994 Pleading index received (Special Master).

Aug 26 1994 Motion of Special Master for Interim Fees and Expenses filed. (NP)

Oct 3 1994 ORDER: The motion of the Special Master for interim fees and expenses is granted and the Special Master is awarded $92,240.78 to be paid a follows: 40% by Kansas, 40% by Colorado and 20% by the United States. The Report of the Special Master is received and ordered filed. Exceptions to the Report, with supporting briefs, may be filed by the parties within 45 days. Reply briefs, if any, may be filed by the parties within 30 days.

Nov 17 1994 Exceptions of Kansas filed.

Nov 17 1994 Exceptions of Colorado filed.

Nov 17 1994 Brief of Wyoming as amicus curiae filed.

Dec 14 1994 Time to file all replies to the exceptions to the Special Master extended to and including January 3, 1995 for all parties.

Dec 30 1994 Colorado's reply brief filed.

Jan 3 1995 Brief for the United States in response to the exceptions of Kansas and Colorado filed.

Jan 3 1995 Kansas' reply opposing Colorado's Exceptions filed.

Jan 4 1995 DISTRIBUTED for Conference of (Jan. 20, 1995 Conf).

Jan 23 1995 ORDER: The Exceptions to the Report of the Special Master are set for oral argument in due course.

Jan 27 1995 Motion of United States for divided argument filed. (NP)

Jan 30 1995 SET FOR ARGURMENT TUESDAY, MARCH 21, 1995. (1ST CASE).

Jan 30 1995 Motion of Kansas for divided argument filed.

Jan 30 1995 Motion of Colorado for divided argument filed.

Feb 1 1995 CIRCULATED.

Feb 9 1995 Response of Kansas to motions of United States and Colorado for divided argument filed.

Feb 21 1995 ORDER: The motion of Kansas for divided argument is granted and the time is allotted as follows: Kansas - 30 minutes, Colorado - 20 minutes, the United States - 10 minutes. The motion of Colorado for divided argument is denied. The motion of the Solicitor General for divided argument is denied.

Mar 21 1995 ARGUED.

May 15 1995 EXCEPTIONS OVERRULED, AND CASE REMANDED. Rehnquist, C.J., delivered the opinion for a unanimous Court.

Jun 14 1995 CERTIFIED COPY OF ORDER SENT TO SPECIAL MASTER.

Nov 20 1995 Motion of Special Master for Interim Fees and Expenses filed. (NP)

Dec 11 1995 ORDER: The motion of the Special Master for fees and reimbursement of expenses for the period August 1, 1994, through November 1, 1995, is granted and the Special Master is awarded a total of $39,132.75 to be paid as follows: for the period August 1, 1994

	through July 31,1995 a total of $21,518.19 to be paid 40% by Kansas, 40% by Colorado and 20% by the United States; for the period August 1, 1995 through November 1, 1995 a total of $17,614.56 to be paid equally by Kansas and Colorado.
Nov 4 1996	Motion of Special Master for interim fees and expenses filed. (NP)
Dec 2 1996	Motion for fees and expenses GRANTED
Sep 9 1997	Second Report of the Special Master received.
Oct 6 1997	The Second Report of the Special Master is received and ordered filed. Exceptions to the Report with supporting briefs may be filed within 45 days. Replies, if any, with supporting briefs may be filed within 30 days.
Oct 27 1997	Waiver of Kansas to file exceptions filed. (NP)
Nov 20 1997	Exceptions of Colorado to Report of Special Master filed.
Nov 24 1997	Motion of Special Master for fees and expenses filed. (NP)
Nov 25 1997	Above motion distributed (12/12/97).
Dec 15 1997	Motion of the Special Master for fees and reimbursement of expenses is granted, and the Special Master is awarded a total of $114, 817.19 for the period October 19, 1996, through September 9, 1997, to be paid equally by Kansas and Colorado.
Dec 22 1997	Reply brief of Kansas filed.
Dec 22 1997	Brief of United States in opposition to Exceptions of Colorado filed.
Jan 20 1998	The exceptions of Colorado to the Second Report of the Special Master are overruled without prejudice to Colorado's Right to renew those exceptions at the conclusion of the Special Master's redemial proceedings.
Mar 12 1999	Motion of Special Master for fees and reimbursement of expenses filed.
Mar 17 1999	Motion of Special Master distributed for Conference April 2, 1999.
Mar 23 1999	Letter of consent from Colorado received.
Mar 29 1999	Letter of consent from Kansas received.
Apr 5 1999	Motion for fees and reimbursement of expenses GRANTED
Feb 18 2000	Motion of the Special Master for award of interim fees and expenses filed.
Feb 23 2000	DISTRIBUTED for Conference of March 17, 2000.
Mar 20 2000	Motion of the Special Master for fees and reimbursement of expenses is granted and the Special Master is awardeda total of $112,783.95 for the period March 3, 1999, through January 28, 2000, to be paid equally by the parties.
Aug 31 2000	Third Report of the Special Master and one volume appendix received.
Sep 13 2000	DISTRIBUTED for Conference of October 6, 2000.
Oct 10 2000	Third Report of Special Master received and ordered filed. Exceptions to the Report, with supporting briefs, may be filed within 45 days. Replies, if any, with supporting briefs, may be filed within 30 days.
Nov 2 2000	Motion of Special Master for Interim Fees and Expenses filed.
Nov 24 2000	Exceptions of Colorado to the Third Report of the Special Master filed.
Nov 24 2000	Exceptions of Kansas to the Third Report of the Special Master filed.
Nov 27 2000	ORDER: Motion of the Special Master for fees and reimbursement of expenses is granted, and the Special Master is awarded a total of $134,165.44 for the period February 1, 2000, through October 15, 2000, to be paid equally by the parties.
Dec 18 2000	Time to file all replies to the Exceptions to the Special Master extended to and including January 3, 2001.

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Jan 3 2001	DISTRIBUTED for Conference of January 19, 2001.
Jan 3 2001	Brief for the United States in opposition to Exceptions of Kansas and Colorado filed.
Jan 3 2001	Colorado's reply brief in opposition to Kansas' Exception to the Third Report of the Special Master filed and distributed.
Jan 3 2001	Reply brief of Kansas opposing Exceptions of Colorado filed and distributed.
Jan 4 2001	Kansas's response to Colorado's motion filed.
Jan 17 2001	Motion of Colorado for leave to file a reply to the brief of the United States filed.
Jan 22 2001	Motion of Colorado for leave to file a reply to the brief of the United States is granted, the parties are allowed to and including February 2, 2001, within which to file replies. The Exceptions to the Report of the Special Master are set for oral argument in due course.
Jan 22 2001	SET FOR ARGUMENT March 19, 2001.
Jan 30 2001	CIRCULATED.
Feb 2 2001	Colorado's reply to brief for the United States in opposition to Exceptions of Kansas and Colorado filed.
Feb 2 2001	Kansas' reply to brief for United States filed.
Feb 27 2001	Motion of the Acting Solicitor General for divided argument filed.
Mar 5 2001	Motion of the Acting Solicitor General for divided argument GRANTED
Mar 7 2001	Kansas Exhibit 1092 and Colorado Exhibit 1253 and list of all exhibits admitted during damage phase of case beginning Nov. 8, 1999 concluded Jan. 28, 2000 received.
Mar 8 2001	Record and exhibits on damages phase of case (7 Boxes) received from Special Master.
Mar 19 2001	ARGUED.
Jun 11 2001	Colorado's exceptions sustained in part and overruled in part; Kansas' exception overruled; and case remanded. STEVENS, J., delivered the opinion of the Court. Opinion by O'CONNOR, J, concurring in part and dissenting in part in which SCALIA and THOMAS, JJ. join.
Jul 11 2001	ORDERED ISSUED.
Jan 30 2003	Motion of Special Master for Interim Fees and Expenses filed.
Feb 12 2003	Motion DISTRIBUTED for Conference of February 28, 2003.
Mar 3 2003	Motion of Special Master for Interim Fees and Expenses GRANTED. The Special Master is awarded a total of $239,652.85 for the period October 16, 2000 through January 17, 2003 to be paid equally by the parties.
Nov 13 2003	Fourth Report of the Special Master received
Nov 19 2003	Report DISTRIBUTED for Conference of December 5, 2003.
Nov 26 2003	Motion for interim fees and expenses for the period January 18, 2003 through November 20, 2003 filed by Special Master.
Dec 8 2003	The Fourth Report of the Special Master is received and ordered filed. Exceptions to the Report, with supporting briefs, may be filed within 45 days. Replies, if any, with supporting briefs, may be filed within 30 days.
Jan 12 2004	Motion for interim fees and expenses for the period January 18, 2003 through November 20, 2003 GRANTED.
Jan 21 2004	Letter from Colorado stating they would not file exceptions
Jan 22 2004	Kansas' Exceptions and Brief filed.
Jan 22 2004	Lodging received from Kansas
Feb 11 2004	Time to file replies to the exceptions to the Report of the Special Master extended to and

	including March 22, 2004 for all parties.
Mar 22 2004	Reply to the Kansas's Exceptions filed by the United States
Mar 22 2004	Reply brief of respondent Colorado opposing the exceptions of Kansas filed.
Apr 27 2004	Motion for leave to file sur-reply filed by plaintiff Kansas.
May 11 2004	Motion DISTRIBUTED for Conference of May 27, 2004.
Jun 1 2004	The motion of Kansas for leave to file a sur-reply is granted. The Exceptions to the Report of the Special Master are set for oral argument in due course.
Jun 1 2004	Sur-Reply filed by Kansas
Jun 10 2004	Motion for divided argument filed by the Solicitor General.
Jun 28 2004	Motion for divided argument filed by the Solicitor General GRANTED.
Jul 23 2004	CIRCULATED.
Aug 22 2004	SET FOR ARGUMENT Monday, October 4, 2004.
Oct 4 2004	Argued. For plaintiff: John B. Draper, Special Assistant Attorney General, Santa Fe, N. Mex. For Colorado: David W. Robbins, Denver, Colo. For the United States: James A. Feldman, Assistant to the Solicitor General, Department of Justice, Washington, D.C.

-105

No. _____, Original

Supreme Court, U.S.
FILED
DEC 16 1985
JOSEPH F. SPANIOL, JR.
CLERK

IN THE

Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,
Plaintiff,

v.

STATE OF COLORADO,
Defendant.

MOTION FOR LEAVE TO FILE COMPLAINT, COMPLAINT, AND BRIEF IN SUPPORT OF MOTION FOR LEAVE TO FILE COMPLAINT.

ROBERT T. STEPHAN
Attorney General of Kansas

JOHN W. CAMPBELL
Assistant Attorney General

RICHARD A. SIMMS
Special Assistant Attorney General
Counsel of Record

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December 16, 1985

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COMPLAINT

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BRIEF IN SUPPORT OF MOTION FOR LEAVE TO FILE COMPLAINT

CERTIFICATE OF SERVICE

No. _____, Original

IN THE

Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,
Plaintiff,

v.

STATE OF COLORADO,
Defendant.

MOTION FOR LEAVE TO FILE COMPLAINT

Comes now the State of Kansas, by its Attorney General, the Honorable Robert T. Stephan, and hereby moves the Court for leave to file its complaint against the State of Colorado.

Respectfully submitted,

ROBERT T. STEPHAN
Attorney General of Kansas

JOHN W. CAMPBELL
Assistant Attorney General

RICHARD A. SIMMS
Special Assistant Attorney General
Counsel of Record

Hinkle, Cox, Eaton, Coffield & Hensley
218 Montezuma
Post Office Box 2068
Santa Fe, New Mexico 87504
(505) 982-4554

No. _____, Original

IN THE

Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,
Plaintiff,

v.

STATE OF COLORADO,
Defendant.

COMPLAINT

The State of Kansas, by its Attorney General, the Honorable Robert T. Stephan, brings this suit against the Defendant, State of Colorado, and for its cause of action states:

1. The jurisdiction of the Court is invoked under Article III, Section 2, Clause 2 of the Constitution of the United States and Paragraph (a), Section 1251, Title 28 of the United States Code.

2. The Arkansas River is an interstate river which rises near Leadville, Colorado and flows south to Salida, Colorado, east through Canon City and Pueblo, and across southeastern Colorado into the State of Kansas.

3. In order to resolve existing and future controversies and to divide and equitably apportion the water of the Arkansas River, Congress consented to the negotiation of a compact by the states of Colorado and Kansas. Act of April 19, 1945, 59 Stat. 53. Subsequently, the Arkansas River Compact was ratified by the State of Colorado by the Act of February 19, 1949, Colo. Rev. Stat. 1963, § 149-9-1; the State of Kansas ratified the Compact by the Act of March 7, 1949, Kansas Gen. Stat. Ann. 1964, § 82a-520. The Compact was approved and enacted into federal law by the Act of Congress of May 31, 1949, 63 Stat. 145. A copy of the Arkansas River Compact is attached hereto as Appendix A and made a part hereof by reference.

4. The principal purpose of the Arkansas River Compact was to "(e)quitably divide and apportion . . . the waters of the Arkansas River and their utilization as well as the benefits arising from the construction, operation and maintenance by the United States of John Martin Reservoir Project for water conservation purposes." 63 Stat. 145, 145, art. I.

5. While expressly recognizing the possibility of offsetting postcompact development of the waters of the Arkansas River by new regulation or increased efficiency, the Compact mandates "that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas . . . by such future development or construction." 63 Stat. 145, 147, art. IV(D).

6. The Compact provides that "Colorado shall administer the decreed rights of water users in Colorado Water District 67 as against each other and as against all rights now or hereafter decreed to water users diverting upstream from John Martin Dam on the basis of relative priorities . . .." 63 Stat. 145, 148, art. V(F).

7. Through the actions of its officers, agents and political subdivisions, the State of Colorado and its water users have materially depleted the usable and available stateline flows of the Arkansas River since the adoption of the Compact.

8. In spite of its duties and obligations under the Compact, since 1949 the State of Colorado has allowed and permitted substantial increases in the diversion and use in Colorado of the surface and hydrologically related ground waters of the Arkansas River, without the concomitant regulatory or conservation measures that the Compact requires to protect the states against material depletions in usable stateline flows.

9. The lack of effective administrative practices in Colorado has encouraged rather than retarded the development of postcompact depletions of the waters of the Arkansas River Basin and has resulted in ongoing, material depletions of the usable flows of the Arkansas River and substantial and irreparable injury to Kansas water users.

10. For more than twenty years, the State of Colorado has investigated and known the impact of the ground water appropriations in the Arkansas River Basin in Colorado. Approximately 150,000 acre feet per year of ground water related to the Arkansas River has been appropriated in Colorado since 1949, and the State of Colorado has intentionally disregarded the findings of its investigations to the effect that such appropriations directly and materially reduce the usable flow and availability of the Arkansas River in Colorado

and Kansas. By its acquiescence in the postcompact proliferation of ground water diversions and its failure to administer the priorities of postcompact ground water diversions with existing surface diversions, Colorado has breached and continues to breach its obligations and responsibilities under the Arkansas River Compact.

11. Since the adoption of the Compact, the State of Colorado has attempted to unilaterally impede the bilateral action of the Compact Administration intended to protect Kansas' Compact apportionment and has failed to apply and administer its internal laws in order to meet its obligations under the Compact.

12. Pursuant to Article VIII(H), the Arkansas River Compact Administration has conducted an investigation of alleged Compact violations. The State of Colorado, however, through its Compact Commissioner, has rejected and continues to reject the State of Kansas' requests to investigate the impact on the Arkansas River of: 1) Colorado's substantial, postcompact ground water depletions of surface flows at the stateline; 2) the failure of Colorado to administer ground water priorities against surface priorities; 3) Colorado's artificially transferring water from the storage pool in Trinidad Reservoir to the sediment pool and then refilling the storage pool to the detriment of downstream users; 4) the consequences of future increases in the consumption of Colorado's transmountain return flows; and 5) Colorado's unilateral rejection of the Arkansas River Compact Administration's Resolution of July 24, 1951, requiring that any reregulaion of the native waters of the Arkansas River be approved by the Compact Administration. Additionally, the State of Colorado refuses to enjoin its postcompact ground water appropriations and resulting surface depletions during the pendency of investigation of the effects of such appropriations, in spite of the irrefutable fact that those appropriations materially deplete the usable and available flows of the Arkansas River. Accordingly, the State of Colorado has used and will continue to use the pending administrative investigation as the basis for prolonging the substantial and irreparable injury to the State of Kansas by wrongfully depriving the State of Kansas and its citizens of the waters of the Arkansas River to which they are entitled under the Compact.

13. Grave and irreparable injury to the State of Kansas and its citizens who were entitled to receive and use the water apportioned to them by the Arkansas River Compact has been caused by the acts and conduct of the State of Colorado, its officers, citizens, and political subdivisions in failing neglecting, and refusing to deliver water to Kansas in the usable and available quantities apportioned to it by the Compact.

14. Grave and irreparable injury will be suffered in the future by the State of Kansas and its citizens unless relief is afforded by this Court to prevent the State of Colorado, its officers, citizens, and political subdivisions from using and withholding water which Kansas is entitled to and which Colorado has heretofore agreed to deliver pursuant to the terms and provisions of the Arkansas River Compact.

15. The State of Kansas has no effective remedy to enforce its rights under the Arkansas River Compact against the State of Colorado other than through the exercise of original jurisdiction in this case.

WHEREFORE, the State of Kansas respectfully prays that the Court issue its decree commanding the State of Colorado, its officers, citizens, and political subdivisions to deliver the waters of the Arkansas River in accordance with the provisions

of the Arkansas River Compact and providing for such other and further relief as the Court may deem appropriate.

Respectfully submitted,

ROBERT T. STEPHAN
Attorney General of Kansas

JOHN W. CAMPBELL
Assistant Attorney General

RICHARD A. SIMMS
Special Assistant Attorney General
Counsel of Record

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APPENDIX A

ARKANSAS RIVER COMPACT, 1948

The State of Colorado and the State of Kansas, parties signatory to this Compact (hereinafter referred to as "Colorado" and "Kansas", respectively, or individually as a "State", or collectively as the "States") having resolved to conclude a compact with respect to the waters of the Arkansas River, and being moved by considerations of interstate comity, having appointed commissioners as follows: "Henry C. Vidal, Gail L. Ireland, and Harry B. Mendenhall, for Colorado; and George S. Knapp, Edward F. Arn, William E. Leavitt, and Roland H. Tate, for Kansas"; and the consent of the Congress of the United States to negotiate and enter into an interstate compact not later than January 1, 1950, having been granted by Public Law 34, 79th Congress, 1st Session, and pursuant thereto the President having designated Hans Kramer as the representative of the United States, the said commissioners for Colorado and Kansas, after negotiations participated in by the representatives of the United States, have agreed as follows:

ARTICLE I

The major purposes of this Compact are to:

A. Settle existing disputes and remove causes of future controversy between the States of Colorado and Kansas, and between citizens of one and citizens of the other State, concerning the waters of the Arkansas River and their control, conservation and utilization for irrigation and other beneficial purposes.

B. Equitably divide and apportion between the States of Colorado and Kansas the waters of the Arkansas River and their utilization as well as the benefits arising from the construction, operation and maintenance by the United States of John Martin Reservoir Project for water conservation purposes.

ARTICLE II

The provisions of this Compact are based on (1) the physical and other conditions peculiar to the Arkansas River and its natural drainage basin, and the nature and location of irrigation and other developments and facilities in connection therewith; (2) the opinion of the United States Supreme Court entered December 6, 1943, in the case of *Colorado v. Kansas* (320 U.S. 383) concerning the relative rights of the respective States in and to the use of waters of the Arkansas River; and (3) the experience derived under various interim executive agreements between the two States apportioning the waters released from the John Martin Reservoir as operated by the Corps of Engineers.

ARTICLE III

As used in this Compact:

A. The word "Stateline" means the geographical boundary line between Colorado and Kansas.

B. The term "waters of the Arkansas River" means the waters originating in the natural drainage basin of the Arkansas River, including its tributaries, upstream from the Stateline, and excluding waters brought into the Arkansas River Basin from other river basins.

C. The term "Stateline flow" means the flow of waters of the Arkansas River as determined by gaging stations located at or near the Stateline. The flow as determined by such stations, whether located in Colorado or Kansas, shall be deemed to be the actual Stateline flow.

D. "John Martin Reservoir Project" is the official name of the facility formerly known as Caddoa Reservoir Project, authorized by the Flood Control Act of 1936, as amended, for construction, operation and maintenance by the War Department, Corps of Engineers, later designated as the Corps of

Engineers, Department of the Army, and herein referred to as the "Corps of Engineers". "John Martin Reservoir" is the water storage space created by "John Martin Dam".

E. The "flood control storage" is that portion of the total storage space in John Martin Reservoir allocated to flood control purposes.

F. The "conservation pool" is that portion of the total storage space in John Martin Reservoir lying below the flood control storage.

G. The "ditches of Colorado Water District 67" are those ditches and canals which divert water from the Arkansas River or its tributaries downstream from John Martin Dam for irrigation use in Colorado.

H. The term "river flow" means the sum of the flows of the Arkansas and the Purgatoire Rivers into John Martin Reservoir as determined by gaging stations appropriately located above said Reservoir.

I. The term "the Administration" means the Arkansas River Compact Administration established under Article VIII.

ARTICLE IV

Both States recognize that:

A. This Compact deals only with the waters of the Arkansas River as defined in Article III.

B. This Compact is not concerned with the rights, if any, of the State of New Mexico or its citizens in and to the use in New Mexico of waters of Trinchera Creek or other tributaries of the Purgatoire River, a tributary of the Arkansas River.

C. (1) John Martin Dam will be operated by the Corps of Engineers to store and release the waters of the Arkansas River in and from John Martin Reservoir for its authorized purposes.

(2) The bottom of the flood control storage is presently fixed by the Chief of Engineers, U.S. Army, at elevation 3,851 feet above mean sea level. The flood control storage will be operated for flood control purposes and to those ends will impound or regulate the streamflow volumes that are in excess of the then available storage capacity of the conservation pool. Releases from the flood control storage may be made at times and rates determined by the Corps of Engineers to be necessary or advisable without regard to ditch diversion capacities or requirements in either or both States.

(3) The conservation pool will be operated for the benefit of water users in Colorado and Kansas, both upstream and downstream from John Martin Dam, as provided in this Compact. The maintenance of John Martin Dam and appurtenant works may at times require the Corps of Engineers to release waters then impounded in the conservation pool or to prohibit the storage of water therein until such maintenance work is completed. Flood control operation may also involve temporary utilization of conservation storage.

D. This Compact is not intended to impede or prevent future beneficial development of the Arkansas River basin in Colorado and Kansas by Federal or State agencies, by private enterprise, or by combinations thereof, which may involve construction of dams, reservoir, and other works for the purposes of water utilization and control, as well as the improved or prolonged functioning of existing works: Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction.

ARTICLE V

Colorado and Kansas hereby agree upon the following basis of apportionment of the waters of the Arkansas River:

A. Winter storage in John Martin Reservoir shall commence on November 1st of each year and continue to and include the next succeeding March 31st. During said period all water entering said reservoir up to the limit of the then available conservation capacity shall be stored: Provided, that Colorado may demand releases of water equivalent to the river flow, but such releases shall not exceed 100 c.f.s. (cubic feet per second) and water so released shall be used without avoidable waste.

B. Summer storage in John Martin Reservoir shall commence on April 1st of each year and continue to and include the next succeeding October 31st. During said period, except when Colorado water users are operating under decreed priorities as provided in paragraphs F and G of this Article, all water entering said reservoir up to the limit of the then available conservation capacity shall be stored: Provided, that Colorado may demand releases of water equivalent to the river flow up to 500 c.f.s., and Kansas may demand releases of water equivalent to that portion of the river flow between 500 c.f.s. and 750 c.f.s., irrespective of releases demanded by Colorado.

C. Releases of water stored pursuant to the provisions of paragraphs A and B of this Article shall be made upon demands by Colorado and Kansas concurrently or separately at any time during the summer storage period. Unless increases to meet extraordinary conditions are authorized by the Administration, separate releases of stored water to Colorado shall not exceed 750 c.f.s., separate releases of stored water to Kansas shall not exceed 500 c.f.s., and concurrent releases of stored water shall not exceed a total of 1,250 c.f.s.: Provided, that when water stored in the conservation pool is reduced to a quantity less than 20,000 acre-feet, separate releases of stored water to Colorado shall not exceed 600 c.f.s., separate releases of stored water to Kansas shall not exceed 400 c.f.s., and concurrent releases of stored water shall not exceed 1,000 c.f.s.

D. Releases authorized by paragraphs A, B and C of this Article, except when all Colorado water users are operating under decreed priorities as provided in paragraphs F and G of this Article, shall not impose any call on Colorado water users that divert waters of the Arkansas River upstream from John Martin Dam.

E. (1) Releases of stored water and releases of river flow may be made simultaneously upon the demands of either or both States.

(2) Water released upon concurrent or separate demands shall be applied promptly to beneficial use unless storage thereof downstream is authorized by the Administration.

(3) Releases of river flow and of stored water to Colorado shall be measured by gaging stations located at or near John Martin Dam and the releases to which Kansas is entitled shall be satisfied by an equivalent in Stateline flow.

(4) When water is released from John Martin Reservoir appropriate allowances as determined by the Administration shall be made for the intervals of time required for such water to arrive at the points of diversion in Colorado and at the Stateline.

(5) There shall be no allowance or accumulation of credits or debits for or against either State.

(6) Storage, releases from storage and releases of river flow authorized in this Article shall be accomplished pursuant to procedures prescribed by the Administration under the provisions of Article VIII.

F. In the event the Administration finds that within a period of fourteen (14) days the water in the conservation pool will be or is liable to be exhausted, the Administration shall forthwith notify the State Engineer of Colorado, or his duly authorized representative, that commencing upon a day certain within said fourteen (14) day period, unless a

change of conditions justifies cancellation or modification of such notice, Colorado shall administer the decreed rights of water users in Colorado Water District 67 as against each other and as against all rights now or hereafter decreed to water users diverting upstream from John Martin Dam on the basis of relative priorities in the same manner in which their respective priority rights were administered by Colorado before John Martin Reservoir began to operate and as though John Martin Dam had not been constructed. Such priority administration by Colorado shall be continued until the Administration finds that water is again available in the conservation pool for release as provided in this Compact, and timely notice of such finding shall be given by the Administration to the State Engineer of Colorado or his duly authorized representative: Provided, that except as controlled by the operation of the preceding provisions of this paragraph and other applicable provisions of this Compact, when there is water in the conservation pool the water users upstream from John Martin Reservoir shall not be affected by the decrees to the ditches in Colorado Water District 67. Except when administration in Colorado is on a priority basis the water diversions in Colorado Water District 67 shall be administered by Colorado in accordance with distribution agreements made from time to time between the water users in such District and filed with the Administration and with the State Engineer of Colorado or, in the absence of such agreement, upon the basis of the respective priority decrees, as against each other, in said District.

G. During periods when Colorado reverts to administration of decreed priorities, Kansas shall not be entitled to any portion of the river flow entering John Martin Reservoir. Waters of the Arkansas River originating in Colorado which may flow across the Stateline during such periods are hereby apportioned to Kansas.

H. If the usable quantity and availability for use of the waters of the Arkansas River to water users in Colorado Water

District 67 and Kansas will be thereby materially depleted or adversely affected, (1) priority rights now decreed to the ditches of Colorado Water District 67 shall not hereafter be transferred to other water districts in Colorado or to points of diversion or places of use upstream from John Martin Dam; and (2) the ditch diversion rights from the Arkansas River in Colorado Water District 67, and of Kansas ditches between the Stateline and Garden City shall not hereafter be increased beyond the total present rights of said ditches, without the Administration, in either case (1) or (2), making findings of fact that no such depletion or adverse effect will result from such proposed transfer or increase. Notice of legal proceedings for any such proposed transfer or increase shall be given to the Administration in the manner and within the time provided by the laws of Colorado or Kansas in such cases.

ARTICLE VI

A. (1) Nothing in this Compact shall be construed as impairing the jurisdiction of Kansas over the waters of the Arkansas River that originate in Kansas and over the waters that flow from Colorado across the Stateline into Kansas.

(2) Except as otherwise provided, nothing in this Compact shall be construed as supplanting the administration by Colorado of the rights of appropriators of waters of the Arkansas River in said State as decreed to said appropriators by the courts of Colorado, nor as interfering with the distribution among said appropriators by Colorado, nor as curtailing the diversion and use for irrigation and other beneficial purposes in Colorado of the waters of the Arkansas River.

B. Inasmuch as the Frontier Canal diverts waters of the Arkansas River in Colorado west of the Stateline for irrigation uses in Kansas only, Colorado concedes to Kansas and Kansas hereby assumes exclusive administrative control over the operation of the Frontier Canal and its headworks for such

purposes, to the same extent as though said works were located entirely within the State of Kansas. Water carried across the Stateline in the Frontier Canal or another similarly situated canal shall be considered to be part of the Stateline flow.

ARTICLE VII

A. Each State shall be subject to the terms of this Compact. Where the name of the State or the term "State" is used in this Compact these shall be construed to include any person or entity of any nature whatsoever using, claiming or in any manner asserting any right to the use of the waters of the Arkansas River under the authority of that State.

B. This Compact establishes no general principle or precedent with respect to any other interstate stream.

C. Wherever any State or Federal official or agency is referred to in this Compact such reference shall apply to the comparable official or agency succeeding to their duties and functions.

ARTICLE VIII

A. To administer the provisions of this Compact there is hereby created an interstate agency to be known as the Arkansas River Compact Administration herein designated as "The Adminstration."

B. The Administration shall have power to:

(1) Adopt, amend and revoke by-laws, rules and regulations consistent with the provisions of this Compact;

(2) Prescribe procedures for the administration of this Compact: Provided, that where such procedures involve the operations of John Martin Reservoir Project they shall be subject to the approval of the District Engineer in charge of said Project;

(3) Perform all functions required to implement this Compact and to do all things necessary, proper or convenient in the performance of its duties.

C. The membership of the Administration shall consist of three representatives from each State who shall be appointed by the respective Governors for a term not to exceed four years. One Colorado representative shall be a resident of and water right owner in Water Districts 14 or 17, one Colorado representative shall be a resident of and water right owner in Water District 67, and one Colorado representative shall be the Director of the Colorado Water Conservation Board. Two Kansas representatives shall be residents of and water right owners in the counties of Finney, Kearny or Hamilton, and one Kansas representative shall be the chief State official charged with the adminsitration of water rights in Kansas. The President of the United States is hereby requested to designate a representative of the United States, and if a representative is so designated he shall be an ex-officio member and act as chairman of the Administration without vote.

D. The State representatives shall be appointed by the respective Governors within thirty days after the effective date of this Compact. The Administration shall meet and organize within sixty days after such effective date. A quorum for any meeting shall consist of four members of the Administration: Provided, that at least two members are present from each State. Each State shall have but one vote in the Administration and every decision, authorization or other action shall require unanimous vote. In case of a divided vote on any matter within the purview of the Administration, the Administration may, by subsequent unanimous vote, refer the matter for arbitration to the Representative of the United States or other arbitrator or arbitrators, in which event the decision made by such arbitrator or arbitrators shall be binding upon the Administration.

E. (1) The salaries, if any, and the personal expenses of each member shall be paid by the government which he represents. All other expenses incident to the administration of this Compact which are not paid by the United States shall be borne by the States on the basis of 60 per cent by Colorado and 40 per cent by Kansas.

(2) In each even numbered year the Administration shall adopt and transmit to the Governor of each State its budget covering anticipated expenses for the forthcoming biennium and the amount thereof payable by each State. Each State shall appropriate and pay the amount due by it to the Administration.

(3) The Administration shall keep accurate accounts of all receipts and disbursements and shall include a statement thereof, together with a certificate of audit by a certified public accountant, in its annual report. Each State shall have the right to make an examination and audit of the accounts of the Administration at any time.

F. Each State shall provide such available facilites, equipment and other assistance as the Administration may need to carry out its duties. To supplement such available assistance the Administration may employ engineering, legal, clerical, and other aid as in its judgment may be necessary for the performance of its functions. Such employees shall be paid by and be responsible to the Administration, and shall not be considered to be employees of either State.

G. (1) The Administration shall cooperate with the chief official of each State charged with the administration of water rights and with Federal agencies in the systematic determination and correlation of the facts as to the flow and diversion of the waters of the Arkansas River and as to the operation and siltation of John Martin Reservoir and other related structures. The Administration shall cooperate in the procurement, interchange, compilation and publication of all factual data bearing

upon the administration of this Compact without, in general, duplicating measurements, observations or publications made by State or Federal agencies. State officials shall furnish pertinent factual data to the Administration upon its request. The Administration shall, with the collaboration of the appropriate Federal and State agencies, determine as may be necessary from time to time, the location of gaging stations required for the proper administration of this Compact and shall designate the official records of such stations for its official use.

(2) The Director, U.S. Geological Survey, the Commissioner of Reclamation and the Chief of Engineers, U.S. Army, are hereby requested to collaborate with the Administration and with appropriate State officials in the systematic determination and correlation of data referred to in paragraph G (1) of this Article and in the execution of other duties of such officials which may be necessary for the proper administration of this Compact.

(3) If deemed necessary for the administration of this Compact, the Administration may require the installation and maintenance, at the expense of water users, of measuring devices of approved type in any ditch or groups of ditches diverting water from the Arkansas River in Colorado or Kansas. The chief official of each State charged with the administration of water rights shall supervise the execution of the Administration's requirements for such installations.

H. Violation of any of the provisions of this Compact or other actions prejudicial thereto which come to the attention of the Administration shall be promptly investigated by it. When deemed advisable as the result of such investigation, the Administration may report its findings and recommendations to the State official who is charged with the administration of water rights for appropriate action, it being the intent of this Compact that enforcement of its terms shall

be accomplished in general through the State agencies and officials charged with the administration of water rights.

I. Findings of fact made by the Administration shall not be conclusive in any court or before any agency or tribunal but shall constitute prima facie evidence of the facts found.

J. The Administration shall report annually to the Governors of the States and to the President of the United States as to matters within its purview.

ARTICLE IX

A. This Compact shall become effective when ratified by the Legislature of each State and when consented to by the Congress of the United States by legislation providing substantially, among other things, as follows:

"Nothing contained in this Act or in the Compact herein consented to shall be construed as impairing or affecting the sovereignty of the United States or any of its rights or jurisdiction in and over the area or waters which are the subject of such Compact: Provided, that the Chief of Engineers is hereby authorized to operate the conservation features of the John Martin Reservoir Project in a manner conforming to such Compact with such exceptions as he and the Administration created pursuant to the Compact may jointly approve."

B. This Compact shall remain in effect until modified or terminated by unanimous action of the States and in the event of modification or termination all rights then established or recognized by this Compact shall continue unimpaired.

IN WITNESS WHEREOF, The commissioners have signed this Compact in triplicate original, one of which shall be forwarded to the Secretary of State of the United States of America and one of which shall be forwarded to the Governor of each signatory State.

Done in the City and County of Denver, in the state of Colorado, on the fourteenth day of December, in the Year of our Lord One Thousand Nine Hundred and Forty-eight.

Henry C. Vidal
Gail L. Ireland
Harry B. Mendenhall
Commissioners for Colorado

George S. Knapp
Edward F. Arn
William E. Leavitt
Roland H. Tate
Commissioners for Kansas

Attest:
Warden L. Noe
Secretary

Approved:
Hans Kramer
Representative of the United States

No. _____, Original

IN THE

Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,
Plaintiff,

v.

STATE OF COLORADO,
Defendant.

BRIEF IN SUPPORT OF MOTION FOR LEAVE TO FILE COMPLAINT

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BRIEF IN SUPPORT OF MOTION FOR LEAVE TO FILE COMPLAINT

STATEMENT OF THE CASE

This is an action to enforce the apportionment made to the State of Kansas by the Arkansas River Compact. Act of May 31, 1949, 63 Stat. 145. Since the Compact was enacted in 1949, continued development in Colorado, primarily by unregulated alluvial wells, has depleted the flows of the Arkansas River and has substantially impaired Kansas' entitlement under the Compact. Lacking any other effective remedy, Kansas

seeks to avail itself of the original jurisdiction of the Court to enjoin the continuing compact violations that are causing substantial and irreparable injury to downstream water users in Kansas.

The original jurisdiction of this Court is invoked under Article III, Section 2, Clause 2 of the United States Constitution and under the Judiciary Act, 28 U.S.C. § 1251 (a).

STATEMENT OF FACTS

The states of Colorado and Kansas agreed to an equitable apportionment of the waters of the Arkansas River in the Arkansas River Compact of December 14, 1948. *See,* Act of March 7, 1949, Kansas Gen. Stat. Ann. 1964 § 83a-520; Act of February 19, 1959, Colo Rev. Stat. 1963, § 149-9-1. The Compact resolved the longstanding conflict over each state's entitlement to the Arkansas River. *See, Kansas v. Colorado,* 206 U.S. 46 (1907); *Colorado v. Kansas,* 320 U.S. 383 (1943). Predicated on the construction of a major water conservation and storage project, John Martin Reservoir, the Compact's apportionment of the Arkansas River was intended to remove the ambiguity and uncertainty that had resulted in litigation and to allow for future development in the Arkansas River Basin, so long as the proposed development would not materially deplete in usable quantity or availability the flows of the river at the stateline. Article IV(D), 63 Stat. 145, 147. The Arkansas River Compact was approved and enacted into federal law by the Act of Congress of May 31, 1949, 63 Stat. 145.

As was anticipated by the states when the Compact was negotiated, the usable stateline flows increased as a result of the construction and operation of John Martin Reservoir. *See,* Article V, 63 Stat. 145, 147-149. Since 1974, however, there has been a substantial decrease in usable stateline flows.

According to numerous hydrologic studies, including studies conducted for the Colorado State Engineer and the Colorado Water Conservation Board, the primary cause of the post-compact depletions of stateline flows has been the development of some 1,500 unregulated alluvial wells in Colorado. *See, e.g.,* Colorado Office of the State Engineer, "Stream Depletion by Wells in the Arkansas River Basin," 1975; W. W. Wheeler and Associates and Woodward-Clyde Consultants, "Water Legislation Investigations for the Arkansas River Basin in Colorado," Vols. I & II, 1968; Luckey, Richard R. and Livingston, Russell K., "Reservoir Release Routing Model for the Upper Arkansas River Basin of Colorado," Colorado Water Resources Circular 27, 1975. The problem derived from the Colorado State Engineer's refusal to coordinate the administration of surface and tributary ground water. *See,* Moses & Vranesh, "Colorado's Ground Water Laws," 38 U.Colo.L.Rev. 294 (1966). Until 1965, after nearly all of the well development had taken place in Colorado, there was absolutely no administration of ground water withdrawals in the Arkansas River Basin of Colorado. *See, e.g.,* Hillhouse, "Integrating Ground & Surface Water Use in an Appropriation State," 20 Rocky Mountain Min. L. Inst. 691 (1975).

After Colorado's ground water depletions became manifest on surface flows at the stateline, Colorado's deficient administrative practices above John Martin Reservoir were raised by Kansas at meetings of the Arkansas River Compact Administration, the interstate body created to administer the provisions of the Compact. *See,* Article VIII, 63 Stat. 145, 149-151. Numerous special and regular meetings of the Administration were devoted to discussion of the problems, but essentially no progress was made toward their resolution. In 1982, the Attorneys General of both states met with the Administration to clarify the issues. After nearly two years of discussions and a protracted exchange of correspondence, the matter was brought to a head by an unsuccessful attempt

by Kansas to initiate arbitration pursuant to Article VIII(D) of the Compact. 63 Stat. 145, 149.

In September, 1983, the State of Kansas retained an independent consulting firm to begin an engineering and geohydrologic analysis of postcompact depletions in usable stateline flows. Following the preliminary assessment of its consulting engineers, Kansas also initiated a bilateral administrative investigation of the depletions pursuant to Article VIII(H) of the Compact. The Compact Administration resolved on March 28, 1985, pursuant to Article VIII(H), to investigate Kansas' allegations of compact violation, as well as counter-allegations made by Colorado. To carry out the Resolution a committee was created, consisting of the Director of the Colorado Water Conservation Board and the Chief Engineer of Kansas. The committee was charged with the conduct of the investigation and to report to the Administration "on a monthly basis in regard to each issue for which the investigation is incompleted."

As amended on July 12, 1985, the Resolution of March 28, 1985 calls for the prompt investigation of:

> 1. Whether the waters of the Arkansas River have been or are being materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under the Compact by:
>
> a. the operation of the Trinidad Dam and Reservoir Project, Colorado,
>
> b. the operation of Pueblo Dam and Reservoir, Colorado, and the winter water storage program on the Arkansas River in Colorado,
>
> c. well development of the waters of the Arkansas River in Colorado, and
>
> d. well development of the waters of the Arkansas River in Kansas;

> 2. Whether water released from John Martin Dam and Reservoir has been stored in Lake McKinney, Kansas, rather than being applied promptly to beneficial use, without the prior authorization of the Administration;
>
> 3. Whether the State of Colorado has complied with the provisions of Article V F of the Arkansas River Compact in the administration of the decreed rights of water users in Colorado Water District 67 as against each other and as against all rights now and hereafter decreed to water users diverting upstream from John Martin Dam, including groundwater rights, on the basis of relative priorities; and
>
> 4. Whether there have been increases in ditch diversion rights from the Arkansas River by Kansas ditches between the Stateline and Garden City beyond the rights existing at the time of the execution of the Compact, which increases have occurred without the Administration first making findings of fact that the usable quantity and availability for use of the waters of the Arkansas River to water users in Colorado Water District 67 and Kansas would not be thereby materially depleted or adversely affected.

Subsequently, the committee met on a monthly basis to pursue the investigation. In addition to existing studies of well depletions, the committee agreed to construct a series of eight mass diagrams, plotted in six different ways. It was agreed that mass diagrams could be used to identify postcompact changes in the regimen of the river, but that the diagrams would not be useful in isolating the cause or causes of any indicated change.

On July 12, 1985, the investigation committee held a third meeting in Lamar, Colorado. After preliminary discussions

failed to produce a consensus regarding the conclusions that could be drawn from the diagrams, it was agreed that each state would prepare a report interpretating the data and mass diagrams. Colorado's report, dated September 6, 1985, and Kansas' report dated September 4, 1985, contain the divergent findings and conclusions of the states. At its fourth meeting on September 17, 1985, the committee discussed the conclusions in the respective reports, but was unable to agree on the conclusions to be drawn from the studies and on what further investigation, if any, should be undertaken.

The committee met again on October 8, 1985. Prior to the meeting, the two states had exchanged their supplemental reports, *viz.*, "Supplemental Report to the Arkansas River Compact Administration Regarding the Article VIII(H) Investigation of Alleged Violations of the Arkansas River Compact," David L. Pope, October 4, 1985, and "Memorandum to the Arkansas River Administration," J. William McDonald, October 4, 1985.

The Colorado report concluded that the mass analyses indicated no significant historic depletions, with the possible exception of tributary inflow from the eastern plains of Colorado. Accordingly, Colorado took the position that only "plains precipitation during the period 1974-1982 is a matter that warrants further investigation." *Id.*, p. 22. Colorado also stated that it could not "agree to undertake an investigation into well development in Colorado when the single and double mass diagrams [did] not suggest that well development in Colorado [had] had an impact on usable stateline flows." *Id.*, p. 23. Kansas, on the other hand, based its view of the investigation on certain relevant engineering studies, the history of water use on the Arkansas River, and the single and double mass analyses, and concluded that there had been significant postcompact depletions, primarily from well development in the 1950s and

1960s, and that further bilateral investigation of the depletions should be undertaken in ten different areas.

On October 8, 1985, the Arkansas River Compact Administration adopted a resolution terminating the Article VIII(H) investigation except in the limited area of mutual agreement that the investigation should proceed. At that time, Colorado expressly refused to undertake an investigation into well development in Colorado until such time as an investigation of drought and soil convervation pointed to further investigation. In short, Colorado refused to investigate the substance of Kansas' claims concerning the material depletions in usable stateline flows caused by certain administrative practices and the proliferation of unregulated postcompact wells.

At the meeting of the Compact Administration on December 10, 1985, Colorado rejected Kansas' requests to investigate the impact on the Arkansas River of: 1) Colorado's substantial, postcompact ground water depletions of surface flows at the stateline; 2) the failure of Colorado to administer ground water priorities against surface priorities; 3) Colorado's artificially transferring water from the storage pool in Trinidad Reservoir to the sediment pool and then refilling the storage pool to the detriment of downstream users; 4) the consequences of expected future increases in the consumption of Colorado's transmountain return flows; and 5) Colorado's unilateral rejection of the Arkansas River Compact Administration's Resolution of July 24, 1951, requiring that any reregulation of the native waters of the Arkansas River be approved by the Compact Administration. Additionally, Colorado refused to enjoin its postcompact ground water appropriations which result in surface depletions, despite the fact that those appropriations materially deplete the usable and available flows of the Arkansas River. Consequently, Kansas has no alternative but to invoke the original jurisdiction of this Court to protect down-

stream water users in Kansas who are being harmed by Colorado's continuing violations of the Compact.

POINTS OF LAW

The Court has held that conflicts between states concerning entitlement to the waters of interstate streams may properly be adjudicated under the Court's original jurisdiction. Article III, Section 2, United States Constitution; 28 U.S.C. § 1251; *Nebraska v. Wyoming*, 325 U.S. 589 (1945); *Colorado v. Kansas*, 320 U.S. 383 (1943); *Wyoming v. Colorado*, 259 U.S. 419 (1922). In addition, the Court has exercised its original jurisdiction to determine the rights between two states to waters of an interstate stream that are equitably apportioned under a compact. *Texas v. New Mexico*, 421 U.S. 927 (1975). In this case, Colorado has violated the Arkansas River Compact by allowing substantial postcompact increases in water use. Colorado's actions have resulted in the material depletion of the Arkansas River and have impaired Kansas' entitlement as clearly defined by the Compact, a federal law, to the waters of the Arkansas River. Therefore, the case presents a justiciable controversy which ought to and can only be decided by this Court. *Hinderlider v. La Plata and Cherry Creek Ditch Co.*, 304 U.S. 92 (1938); *Texas v. New Mexico*, 462 U.S. 554 (1983).

The administrative investigation pursuant to Article VIII(H) has effectively terminated because of Colorado's refusal to cooperate. Colorado has taken the position that the investigation should continue at a snail's pace, in areas unrelated to the basic problem identified by all of the experts, including Colorado's own officers and consultants. In response to Colorado's stonewalling, and in view of the ongoing substantial injury to water users in Kansas, Kansas retained the internationally recognized firm of S. S. Papadopulos & Associates, Inc. to

evaluate the impact of postcompact well development and water use in Colorado on the Arkansas River. In its Report to the Arkansas River Compact Administration Regarding the Article VIII(H) Investigation of Alleged Violations of the Arkansas River Compact of December 6, 1985, Papadopulos & Associates express the opinion that postcompact well development in Colorado has unquestionably materially and substantially depleted the Arkansas River and that Colorado's purposeful attempt to avoid study of well depletions is not remotely justifiable on the basis of any hydrologic or engineering reason. The conclusion follows that Colorado seeks to delay or obstruct the Administration's investigation of postcompact wells to avoid the inevitable determination that the wells were and are resulting in compact violation.

Colorado has followed and continues to follow a course of conduct that renders the administrative investigation a meaningless effort designed to delay a resolution of the conflict. At the same time, Colorado continues its ongoing violation of the Compact to the substantial injury of Kansas. Accordingly, the Court should exercise its jurisdiction to decide this controversy, which will result in a prompt and efficient resolution of an existing and inevitable conflict.

It is respectfully requested that the motion for leave to file the Complaint be granted.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I, Richard A. Simms, hereby certify, pursuant to Rule 9(2) of the Rules of the Supreme Court of the United States, that on the 16th day of December, 1985, I served the requisite number of copies of the foregoing Motion for Leave to File Complaint, Complaint, and Brief in Support of Motion for Leave to File Complaint, by first class mail, on the Governor and the Attorney General of the State of Colorado, and on opposing counsel.

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IN THE

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October Term, 1985

STATE OF KANSAS,
Petitioner,

v.

STATE OF COLORADO,
Respondents.

COLORADO'S BRIEF IN OPPOSITION TO MOTION FOR LEAVE TO FILE COMPLAINT.

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INTRODUCTION

The State of Colorado respectfully requests the Court to deny the Motion for Leave to File Complaint filed by the State of Kansas. The complaint alleges material depletion of the waters of the Arkansas River in Colorado in violation of the Arkansas River Compact.[1] Colorado submits that Kansas has not made a reasonable effort to resolve this matter through the Arkansas River Compact Administration ("Administration").[2] Absent such an effort, this Court should decline to hear this matter.

Contrary to the suggestion by Kansas, there is substantial disagreement as to whether post-compact well development in Colorado has materially depleted the flow of the Arkansas River in violation of Article IV.D. and/or Article V.F. of the Arkansas River Compact. The Court should deny the motion for leave to file a complaint because Kansas has an adequate means for vindicating its concerns through a pending investigation by the Administration. *See Texas v. New Mexico,* 462 U.S. 554, 571 n. 18 (1983). Premature invocation of the Court's jurisdiction would deny the Court the benefit of the special

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[1]The United States Congress granted consent to Colorado and Kansas to negotiate a compact for the apportionment of the waters of the Arkansas River in 1945. Act of April 19, 1945, 59 Stat. 53. The Arkansas River Compact was signed by the commissioners appointed by Colorado and Kansas on December 14, 1948. The Compact was ratified by the legislature of each state and approved by Congress in 1949. Act of May 31, 1949, 63 Stat. 145. The Compact ended nearly fifty years of litigation over the use of waters of the Arkansas River. *See* Kansas v. Colorado, 206 U.S. 46 (1907); Colorado v. Kansas, 320 U.S. 383 (1943).

[2]The Arkansas River Compact Administration is an interstate agency created by the Arkansas River Compact to administer the provisions of the Compact. Art. VIII.A. The membership of the Administration consists of three representatives from each state appointed by the respective governors. Art. VIII.C. Each state has one vote in the Administration. Art. VIII.D.

expertise and abilities of the Administration in addressing complex hydrologic facts about ground water usage and would saddle this Court with burdensome original jurisdiction litigation over complaints that can be resolved or narrowed by the Administration.[3] *Id.; Far East Conference v. United States,* 342 U.S. 570, 574-75 (1952). In that regard, Colorado agrees with the United States Representative to the Administration[4] that the Arkansas River Compact obligates a complaining state to make a reasonable effort to pursue resolution through the mechanisms provided for in the Compact before resorting to litigation against the other compacting state.[5] Colorado also agrees with the United States Representative that Kansas has not followed

[3]The Compact directs the Administration to investigate promptly violation of any of the provisions of the Compact or other actions prejudicial thereto which come to its attention. Art. VIII.H; *see also* Art. VIII.G. relating to the fact-finding duties of the Administration. When deemed advisable as the result of an investigation, the Administration can report its findings and recommendations to the state official charged with administration of water rights for appropriate action. Art. VIII.H. Findings of fact made by the Administration are not conclusive, but do constitute *prima facie* evidence of the facts found. Art. VIII.J. This provision is nearly identical to Article V(f) of the Pecos River Compact. *See* Texas v. New Mexico, 462 U.S. 554, 568 n. 14 (1983).

[4]The Compact provides for the President to designate a representative of the United States to the Administration to act as chairman but without vote. Art. VIII.C.

[5]*See* Remarks of the U.S. Representative to the Arkansas River Compact Administration at the annual meeting of the Administration held in Pueblo, Colorado. (Dec. 10, 1985) (printed in Appendix A). However, Colorado does not agree with the suggestion by the U.S. representative that it is essential that there be an arbitration of every dispute under the Compact. Article VIII.D. of the Compact merely provides that in the case of a divided vote on any matter within the purview of the Administration, the Administration "may" refer a matter for arbitration by a subsequent unanimous vote of both states. Whether arbitration is appropriate to resolve a matter under the Compact depends on agreement of the states on a case-by-case basis.

"those procedures which appear to me clearly to be reasonable and necessary before either [state] successfully claims that its administrative remedies have been exhausted and that it must seek relief outside or beyond the Compact Administration."[6]

STATEMENT OF THE QUESTION PRESENTED

Has the State of Kansas met its burden to demonstrate that a pending investigation by the Arkansas River Compact Administration is not an adequate means to vindicate its allegations of Compact violations?

SUPPLEMENTAL STATEMENT OF FACTS

Colorado supplements the statement of facts in the Kansas brief to permit the Court to determine whether Kansas has met its burden to demonstrate the necessity of an original forum in this Court.

A. Administration Investigation

On March 28, 1985, at the request of Kansas and Colorado, the Administration adopted a resolution, by unanimous vote, to investigate a number of allegations of violations of the Compact, including well development in both states. *See* Kansas Brief at 4. The resolution established a committee consisting of the director of the Colorado Water Conservation Board or his designee and the Chief Engineer of Kansas or his designee to conduct the investigation.[7] Beginning in April, 1985, the com-

[6]Appendix A at 4a.

[7]The director of the Colorado Water Conservation Board and the Chief Engineer of the Kansas Division of Water Resources are *ex officio* members of the Administration. Art. VIII.C. Both agencies have considerable expertise in conducting water investigations. *See, e.g.,* Colo.Rev. Stat. §37-60-101, *et seq.* (1973), as amended, for the powers and duties of the Colorado Water Conservation Board. In addition, the Compact provides that state officials shall furnish pertinent factual data to the Administration upon its request. Art. VIII.G. (1). The director of the U.S. Geological Survey, the commissioner of the U.S. Bureau of Reclamation, and the chief engineer of the U.S. Army Corps of Engineers are also requested to assist the Administration in the execution of its duties. Art VIII.G(2).

mittee devoted substantial efforts to establishing a data base and preparing a mass diagram analysis to determine if there had been any changes in the relationship between streamflows at selected locations in the Arkansas River Basin. *Id.* at 5.

On July 12, 1985, at the request of the Kansas representatives, the Administration agreed to amend the March 28, 1985 resolution to include an investigation of whether Colorado had complied with the provisions of Article V.F. of the Compact concerning the administration of decreed rights in Colorado on the basis of relative priorities. See Kansas Brief at 4.

On October 8, 1985, after extensive reports were submitted by both committee members on the status of the investigation, the Administration expressly authorized the committee to "continue with its investigation of the matters upon which the Committee has mutually agreed that further investigation should be undertaken."[8]

Approximately two weeks later, on October 25, 1985, Kansas Attorney General Robert Stephan announced to an interim committee of the Kansas legislature that effective relief was not available through the Administration and that he had directed his staff to initiate litigation against Colorado to be filed on December 16, 1985. Topeka Capital J., Oct. 26, 1985, at 1, Col. 1.

To understand the reason for the disagreement between the Kansas Attorney General and the Administration on how the investigation should proceed, the following background facts concerning well regulation in the Arkansas River Valley in Colorado are necessary.

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[8]Resolution adopted at Arkansas River Compact Administration meeting held at Garden City, Kansas (Oct. 8, 1985) (printed in Appendix B).

B. Background Facts

Prior to 1965, the Colorado State Engineer believed he had no authority to regulate ground water diversions. *See Fellhauer v. People,* 167 Colo. 320, 328, 447 P.2d 986, 990 (1968). In 1965, the Colorado General Assembly enacted legislation to vest the State Engineer with clear authority to regulate ground water diversions in the priority system and to regulate the issuance of new well permits. The Colorado water officials then attempted to curtail out-of-priority diversions by a group of wells in the Arkansas River Basin. The Colorado Supreme Court held that this attempt to enforce the 1965 legislation was unconstitutional and set forth three requirements for the valid and constitutional regulation of wells in the Arkansas River Valley. *Id.* at 334-35, 447 P.2d at 993. The District Court's decision in that case prompted the Colorado General Assembly to authorize an investigation to determine, *inter alia,* the need for legislation that would provide for integrated administration of surface and ground water. 1967 Colo. Sess. Laws, Ch. 175, §1. One of the studies prepared in connection with this investigation is the first of the three studies cited in the Kansas brief. W. W. Wheeler and Associates and Woodward-Clyde & Associates, Water Legislation Investigations for the Arkansas River Basin in Colorado (1968).

In 1969, the Colorado General Assembly enacted the Water Right Determination and Administration Act of 1969. Colo. Rev.Stat. §37-92-101, *et seq.* (1973), as amended (hereinafter the "1969 Act"). On November 16, 1972, pursuant to the authority granted in the 1969 Act to integrate the administration of surface and tributary ground water in the Arkansas River Valley, the Colorado State Engineer promulgated rules and regulations to progressively curtail ground water uses in the Arkansas River

Valley four days a week to protect senior appropriators.[9] These rules have been in continuous effect for the past thirteen years.

On January 4, 1974, the State Engineer proposed an amendment to the rules and regulations to further curtail ground water uses. Protests to the amendment were filed by various well owners under the provisions of the 1969 Act providing for notice and an opportunity to be heard prior to the enforcement of amendments to existing rules and regulations. Colo.Rev.Stat. §37-92-501(2) (f)-(h). After hearings on protests to the amendment, the Colorado Water Judge for Water Division No. 2[10] entered a judgment disapproving the proposed amendment and ordered that the existing rules and regulations be continued in effect. *In re the Amendment of the Rules and Regulations Governing the Use, Control and Protection of Surface and Ground Water Rights Located in the Arkansas River and Its Tributaries,* Case Nos. W-4079, W-4080, W-4083, W-4084, and W-4085 (Dist. Ct., Water Division No. 2, Dec. 1, 1976), *aff'd sub. nom. Kuiper v. Atchison, Topeka & Sante Fe Ry.,* 195 Colo. 557, 581 P.2d 293 (1978).

The Water Judge found that notwithstanding the theoretical analyses offered by the State Engineer to support his contention that wells had depleted surface flows of the Arkansas River, there was no competent evidence in the record that stream flows had in fact suffered during the post-well period or that reductions, if any, could be traced to well diversions rather than to other causes, including increased irrigation efficiencies, phreatophyte and evaporation losses, or declines in tributary inflow. The Water Judge considered the reports cited in the Kansas brief but concluded that they ignored numerous factors which could increase or decrease river flow and were based on assumptions about ground water diversions which were not supported by competent evidence. The Water Judge's decision was affirmed on appeal by the Colorado Supreme Court. *Kuiper v. Atchison, Topeka & Sante Fe Ry., supra.* It was against this background that the committee began its investigation of well development in Colorado.

[9]Hillhouse, *Integrating Ground and Surface Water Use in an Appropriation State,* 20 Rocky Mountain Min. L. Inst. 691 (1975), describes Colorado's efforts to regulate ground water up to that time.

[10]Under the 1969 Act, Colorado was divided into seven water divisions based on major drainage basins and sub-basins. Colo.Rev.Stat §37-92-201. A district judge in each water division was designated as a "water judge" with exclusive jurisdiction over "water matters." Colo.Rev.Stat. §37-92-203(l) (1985 Cum. Supp.). The Arkansas River and its tributaries in the State of Colorado were included in Water Division No. 2. Colo.Rev.Stat. §37-92-201(1)(b).

POINTS OF LAW

The Court exercises its original jurisdiction sparingly. *United States v. Nevada,* 412 U.S. 534, 538 (1973). The Court recently stated that it has "substantial discretion to make case-by-case judgments as to the practical necessity of an original forum in this Court for particular disputes within our constitutional original jurisdiction." *Texas v. New Mexico,* 462 U.S. 554, 570 (1983).

Where a compact creates an interstate agency to administer the provisions of the compact, and that agency is directed to investigate violations of the provisions of a compact and to report its findings and recommendations to the state officials charged with the administration of water rights for appropriate action, a compact provides an adequate means for vindicating either state's complaints of compact violations, in the absence of unusual circumstances, such as bad faith, inability to act, or undue delay. *See Texas v. New Mexico,* 462 U.S. 554, 571 n. 18 (1983). This is analogous to the doctrine of primary jurisdiction which

> applies where a claim is originally cognizable in the courts, and comes into play whenever enforcement of the claim

> requires the resolution of issues which, under a regulatory scheme, have been placed within the special competence of an administrative body; in such a case the judicial process is suspended pending referral of such issues to the administrative body for its views.

United States v. Western Pacific R. R., 352 U.S. 59, 64 (1956) The doctrine is based on the principle

> that in cases raising issues of fact not within the conventional experience of judges or cases requiring the exercise of adminstrative discretion, agencies created by Congress for regulating the subject matter should not be passed over.

Far East Conference v. United States, 342 U.S. 570, 574 (1952).

SUMMARY OF ARGUMENT

Colorado believes that there are persuasive reasons to deny the Motion for Leave to File Complaint. To summarize:

1. there is a pending investigation by the Administration of post-compact development in Colorado and Kansas;
2. the Administration is not deadlocked or unable to act, but has been proceeding in a cooperative manner to conduct the investigation;
3. the investigation of well development in Colorado raises complex issues of fact "not within the conventional experience of judges," *Far East Conferece v. United States,* 342 U.S. at 574;
4. passing over the Administration would deny the Court the special expertise of the Administratón in adressing complex hydrologic facts concerning ground water use and would burden the Court with a dispute that might be resolved by the Administraion; and

5. there is little likelihood of injury while the investigation continues.

ARGUMENT

Kansas urges the Court to grant its motion for leave to file its complaint on the grounds that it made an attempt to have the Administration investigate its complaints, but the investigation is proceeding at a "snail's pace" and Colorado "has followed and continues to follow a course of conduct that renders the administrative investigation a meaningless effort designed to delay a resolution of the conflict." Kansas Brief at 8, 9. The facts simply do not support these contentions. First, Kansas did not request the Administration to investigate its principal allegation concerning post-compact well development in Colorado until March 28, 1985. Second, the Colorado representatives did not refuse to investigate the substance of the Kansas allegation. Third, there is substantial disagreement over the facts which can only be resolved by further investigation.

A. The Arkansas River Compact Administration Has Not Had A Reasonable Opportunity To Investigate The Kansas Allegation That Well Development In Colorado Has Materially Depleted Stateline Flows In Violation Of The Compact.

The principal allegation in the proposed complaint is that post-compact well development in Colorado has materially depleted the flow of the Arkansas River in violation of Article IV.D. of the Arkansas River Compact. Complaint, ¶ 8-10; Kansas Brief at 1.

Kansas admits, however, that the well development of which it complains occurred almost exclusively *prior to 1965.* Kansas Brief at 3. Nevertheless, and despite its allegation that since 1974 there has been a substantial decrease in usable stateline flows, *id.* at 2, it was not until March 28, 1985, that Kansas, *for*

the first time, requested the Administration to investigate whether well development in Colorado had caused material depletion to the waters of the Arkansas River. The Kansas brief implies that well development in Colorado had been the subject of discussion by the Administration for several years:

> *After Colorado's ground water depletions became manifest on surface flows at the stateline,* Colorado's deficient *administrative practices* above John Martin Reservoir were raised by Kansas at meetings of the Arkansas River Compact Administration, the interstate body created to administer the provisions of the Compact . . . . Numerous special and regular meetings of the Administration were devoted to discussion of the *problems,* but essentially no progress was made toward their resolution. In 1982, the Attorneys General of both states met with the Administration to clarify the *issues.* After nearly two years of discussions and a protracted exchange of correspondence, the *matter* was brought to a head by an unsuccessful attempt by Kansas to initiate arbitration pursuant to Article VIII(D) of the Compact . . .

Kansas Brief at 3-4 (emphasis added) (citations omitted).

By the use of the terms "administrative practices," "problems," "issues," and "matter," Kansas seeks to convey the impression that these efforts related to its allegation concerning ground water depletions in Colorado. This is not true. The events described in the above-quoted passage from the Kansas brief related to disputes over the operation of Trinidad Reservoir and Pueblo Reservoir in Colorado. *See infra* pp. 17-18. It was not until March 28, 1985, that Kansas requested the Administration to investigate well development in Colorado. At that time the Administration agreed to investigate a number of allegations of violations of the Compact, including well development in both states. *See* Kansas Brief at 4.

As noted in Colorado's supplemental statement of facts, after extensive reports were submitted, the Administration authorized the committee to continue with the investigation on October 8, 1985. The assertion that the pending investigation was proceeding at a "snail's pace" and was a "meaningless effort designed to delay a resolution of the conflict," Kansas Brief at 8, 9, was made by the Kansas Attorney General, not by the Kansas representatives to the Administration, who authorized the investigation to continue on the basis of matters mutually agreed to by the committee established to conduct the investigation.[11]

B. The Colorado Representatives Did Not Refuse To Investigate The Substance Of The Kansas Allegation Concerning Well Development In Colorado.

Kansas briefly notes the substantial effort devoted to the investigation by the committee to establish a data base and prepare a mass diagram analysis of streamflows at selected locations in the Arkansas River Basin. Kansas Brief at 5. The committee then submitted reports to the Administration prior to its October 8, 1985 meeting. Kansas summarizes the report by the director of the Colorado Water Conservation Board as follows:

> The Colorado report concluded that the mass analyses indicated no significant historic depletions, with the possible exception of tributary inflow from the eastern plains of Colorado. Accordingly, Colorado took the position that only "plains precipitation during the period 1974-1982 is a matter that warrants further investigation." ['Memorandum to the Arkansas River Compact Administration,' J. William McDonald, October 4, 1985] p. 22.

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[11]Despite the Kansas Attorney General's announcement on October 25, 1985, the committee proceeded in good-faith with the investigation and met on November 19, 1985, and again on December 10, 1985.

Kansas Brief at 6. This misstates the conclusions and recommendations in the report to the Administration by Mr. McDonald, the director of the Colorado Water Conservation Board. Mr. McDonald's report first set forth points of agreement in previous committee reports and the basis for his conclusions drawn from the mass diagrams prepared during the investigation:

> First, I agree with Mr. Pope [the Kansas Chief Engineer] that there was a substantial decline in usable stateline flows starting in 1974, although I believe this period should be divided at 1980 because changes in the operation of John Martin Reservoir starting in that year affected usable stateline flow. Second, I agree that the relationship between the annual flows of the Arkansas River at Canon City and Las Animas have been fairly constant over the entire post-compact period and that the causes of the decline in usable stateline flows starting in 1974 have been below Las Animas.
>
> Looking at the reach below Las Animas, I concluded that the decline in usable stateline flows from 1974-1979 coincided with a period of below-average flow at Las Animas and a period of drastic decline in tributary inflow from plains drainage areas of eastern Colorado, as reflected in the streamflow records of the Purgatoire River near Las Animas and Big Sandy Creek. I noted that there had been previous declines in usable stateline flows during drought periods, but that previous droughts have been broken up after two or three years by average or above-average flows, whereas the drought cycle in the 1970's lasted for a period of six years before there was a return to average and above-average flows. Further, I noted that usable stateline flows began improving in 1980 when precipitation and streamflow began to recover throughout the basin. Therefore, I concluded that the decline in usable stateline flows was directly related to a decline in tributary inflow from plains drainage areas, combined with below-average flows at Las Animas.

Memorandum from J. William McDonald to the Arkansas River Compact Administration, 4-5 (Oct. 4, 1985) (citations omitted). The report reviewed in detail the reasons for the disagreement as to the possible causes of the decline in usable stateline flows beginning in 1974 and then set forth matters which Mr. McDonald thought were appropriate for further investigation:

> As noted above, both reports are in general agreement that the changes in relationship shown by the double-mass curves occurring since 1974 have been below the Las Animas gage on the Arkansas River. This isolates the reach appropriate for further investigation.
>
> In my opinion, plains precipitation during the period 1974-1982 is a matter that warrants further investigation. In addition, tributary inflow from plains drainage areas may have declined during the period 1974-1979 as the result of soil conservation measures. Such conservation measures were found to have had a substantial effect on streamflow in the Republican River Basin. If, after an investigation of the factors which appear most likely to have caused the decline in usable stateline flows during the period 1974-1982, including: 1) reduced diversions by ditches in Colorado Water District 67; 2) the operating plan for John Martin Reservoir; 3) decreased plains precipitation; and 4) soil conservation measures, it does not appear that this decline can be entirely attributed to such factors, then a further investigation of possible causes may be justified. However, *at this time,* I cannot agree to undertake an investigation into well development in Colorado when the single and double-mass diagrams do not suggest that well development in Colorado has had an impact on usable stateline flows.

Id. at 22-23 (emphasis added).

At the Administration's meeting on October 8, 1985, Mr. McDonald amplified his report by saying that he was not refusing to investigate any potential cause of the decline in usable stateline flows, only that he did not feel that evidence justified the expense of developing a stream-aquifer computer model when there appeared to be more likely causes than well development for the decline in usable stateline flows beginning in 1974.[12]

Kansas then goes on to assert that on October 8, 1985, the Administration adopted a resolution "*terminating* the Article VIII (H) investigation except in the limited area of mutual agreement that the investigation should proceed." Kansas Brief at 7 (emphasis added). Kansas contends that Colorado thereby "refused to investigate the substance of Kansas' claims concerning the material depletions in usable stateline flows caused by certain administrative practices and the proliferation of unregulated postcompact wells." *Id.*

This mischaracterizes both the McDonald report and the Administration's resolution of October 8, 1985, which did not *terminate* the investigation; the resolution provided that the committee "shall *continue* with its investigation of the matters upon which the Committee has mutually agreed that further investigation should be undertaken." Appendix B (emphasis added). Thus, the disagreement was not over whether to investigate, but what to investigate first.

[12]Minutes of Arkansas River Compact Administration meeting held at Garden City, Kansas, 31-32 (Oct. 8, 1985).

C. The Findings By The Colorado Water Court Demonstrate That There Is a Good-Faith Dispute As To Whether Well Development In Colorado Has Materially Depleted Stateline Flows.

Kansas asserts that well development is the "basic problem identified by all of the experts, including Colorado's own officers and consultants," Kansas Brief at 8, and that any suggestion to the contrary is merely "stonewalling" to "delay or obstruct the Administration's investigation of post-compact wells to avoid the inevitable determination that the wells were and are resulting in compact violation." *Id.* at 8, 9. The impression left by Kansas is that Colorado has made no effort to curtail diversions from post-compact wells despite the existence of reports suggesting that well development is the primary cause of post-compact depletions to flows of the Arkansas River. This misrepresents the facts.

The Colorado State Engineer believed that he did not have authority to administer well diversions prior to 1965. *See Felhauer v. People,* 167 Colo. 320, 328, 447 P.2d 986, 990 (1968). Colorado, however, was not unique in this respect. Few states, Kansas being no exception, had adequate laws for the coordinated administration of surface and related ground water at the time.[13] However, since 1965, the Colorado State Engineer has made substantial efforts to regulate ground water diversions in the Arkansas River Valley. *See supra pp. 5-6.* As for the reports prepared for the Colorado State Engineer and the Colorado

[13]Ironically, Kansas did not impose a moratorium on the issuance of new well permits in the Arkansas River Valley in Hamilton and Kearney Counties until 1977, at which time the Kansas Division of Water Resources entered into a five-year cooperative study with the United States Geological Survey to investigate ground water development in the moratorium area. R. Baker, L. Dunlap, B. Sauer, *Analysis and Computer Simulation of Stream-Aquifer Hydrology, Arkansas River Valley, Southwestern Kansas,* U.S.G.S. Water-Supply Paper 2200 at 1, 3 (1983). Hamilton and Kearney Counties are located in the Arkansas River Basin nearest the Colorado-Kansas stateline. *See* attached Map of Arkansas River Basin.

Water Conservation Board, the Colorado Water Court concluded that the theoretical analyses in those reports were not supported by empirical evidence based on streamflow records and that they ignored numerous factors besides well diversions which could increase or decrease river flow and were based on assumptions about ground water diversions that were not supported by competent evidence. While Colorado does not suggest that this decision is binding on Kansas, *see Hinderlider v. La Plata & Cherry Creek Ditch Co.*, 304 U.S. 92, 103 (1938), we do think that a presumption of correctness attaches to the decree under the Compact, which provides that it is "the intent of this Compact that enforcement of its terms shall be accomplished in general through the State agencies and officials charged with the administration of water rights." Art. VIII.H.

Thus, far from being the problem identified by all of the experts, there is substantial evidence that well development in Colorado has been offset by other factors. Every expert who has studied the regimen of the Arkansas River in Colorado, including S.S. Papadopulos & Associates, Inc., has noted that it is "a highly complex system that has been altered by the construction of canals, reservoirs, wells, and inter-basin diversion systems."[14]

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[14]S.S. Papadopulos & Associates, Inc., Report to the Arkansas River Compact Administration Regarding the Article VIII(H) Investigation of Alleged Violations of the Arkansas River Compact, 5 (Dec. 6, 1985). This six-page report was not requested by the Administration but was apparently prepared for the Kansas Attorney General to support the decision to initiate litigation against Colorado. The Papadopulos firm made no independent investigation of well development in Colorado, but merely reviewed the committee reports and various written reports, including those prepared for the Colorado State Engineer and the Colorado Water Conservation Board. The Papadopulos report simply concluded: "Given the complexity of water distribution and use in the Arkansas River Valley, it is imperative that additional investigations consider all factors that may have affected historical streamflow patterns." *Id.* at 6. No one disagrees that further investigation is necessary; the question is how to proceed.

These facts demonstrate that the investigation involves highly complex issues of hydrologic facts, that reasonable experts differ as to the conclusions drawn from the facts at this time, and that further investigation is indeed warranted. It is not the function of this Court to second-guess the Administration on how the investigation ought to be conducted. *See Texas v. New Mexico,* 462 U.S. 554, 570-71 (1983). Nor do the remaining allegations in the complaint support the claim that Kansas has no alternative but to invoke the original jurisdiction of this Court.

D. Other Matters Raised By Kansas Do Not Justify An Original Forum In This Court.

Kansas also alleges that the Colorado representatives to the Administration have rejected requests to investigate: 1) "Colorado's artifically transferring water from the storage pool in Trinidad Reservoir to the sediment pool and then refilling the storage pool to the detriment of downstream users;" 2) "the consequences of future increases in the consumption of Colorado's transmountain return flows;" and 3) "Colorado's unilateral rejection of the Arkansas River Compact Administration's Resolution of July 24, 1951, requiring that any reregulation of the native waters of the Arkansas River be approved by the Compact Administration." Complaint, ¶ 12.

First, with regard to the operation of Trinidad Reservoir,[15] the Colorado representatives did in fact agree to an investiga-

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[15]The Trinidad Project was authorized by the United States Congress in the Flood Control Act of 1958, 72 Stat. 297, 309, *amended by* Act of Oct. 27, 1965, 79 Stat. 1073, 1079. *See* attached Map of Arkansas River Basin. The reservoir was completed and declared ready for the impoundment of water on January 1, 1977; however, storage in substantial amounts did not begin until 1979 because of litigation among Colorado water users. *See* Purgatoire River Water Conservancy Dist. v. Kuiper, 197 Colo. 200, 593 P.2d 333 (1979) (reversing trial court order enjoining storage in the reservoir).

tion of storage in the reservoir under Article VIII.H. of the Compact at a special meeting of the Administration on June 30, 1980. Annual Report, Arkansas River Compact Administration, 47 (1980). At a special meeting on September 25, 1980, the Administration approved findings of fact concerning storage and transfer of water in Trinidad Reservoir during 1979 and 1980 based upon the results of the investigation authorized by the Administration. *Id.* at 12-15. However, the Colorado representatives did not agree that these facts established a violation of the Compact and further investigation was agreed to. *Id.* at 48.

Without reviewing the entire history of the controversy, it is sufficient to point out that Kansas subsequently asserted that Trinidad Reservoir was not being operated in conformity with Operating Principles for the project approved by Kansas and the Administration in 1967. However, that very issue is being addressed in a review by the U.S. Bureau of Reclamation required by the Operating Principles. A draft of this review was submitted to interested parties, including Kansas, on December 20, 1985, with a request for comments by February 15, 1986. Thus, Colorado did not refuse to investigate the operation of Trinidad Reservoir. Moreover, Kansas has adequate means to address its concerns about the operation of the project through the review process being conducted by the U.S. Bureau of Reclamation. *See United States v. Nevada,* 412 U.S. 534, 538 (1973); *Illinois v. Milwaukee,* 406 U.S. 91, 93-94 (1972).

Second, with regard to potential *future* increases in the consumption of transmountain return flows, the director of the Colorado Water Conservation Board concluded during the investigation that the potential consequences were speculative at this time and would be extremely difficult to determine. While Kansas is correct that the Colorado representatives refused to investigate the potential consequences of future increases in the consumption of transmountain return flows,

this is a hypothetical controversy which is not ripe for adjudication. *United Public Workers v. Mitchell,* 330 U.S. 75 (1947).

Third, with regard to the Administration's Resolution of July 24, 1951, the resolution expressed as a policy of the Administration that there be no reregulation of native waters of the Arkansas River as proposed in a report on the Gunnison-Arkansas Project until a plan of operation had been submitted to and approved by the Administration. When this matter was first raised by Kansas in 1982, the Colorado representatives did not agree that the resolution was applicable to the Fryingpan-Arkansas Project, a major transmountain water diversion project which was authorized by Congress in 1962, of which Pueblo Reservoir is a component. Act of August 16, 1962, 76 Stat. 389. However, even if the resolution were applicable to the Fryingpan-Arkansas Project, Colorado believes that the policy of prior approval set forth in the 1951 resolution was waived when the Administration failed to raise an objection to the winter storage program in Pueblo Reservoir for at least six years after it began operation in 1975 with the full knowledge of the Administration! Furthermore, the Colorado representatives agreed in the resolution of March 28, 1985, to investigate the operation of the winter storage program in Pueblo Reservoir, Kansas Brief at 4, notwithstanding the fact that the United States Geological Survey ("U.S.G.S.") had performed a review of the potential reduction of inflow to John Martin Reservoir from winter storage in Pueblo Reservoir in 1981 based upon a request of the Kansas representatives. The U.S.G.S. concluded, consistent with its previous evaluation of winter storage in Pueblo Reservoir in 1975, that there was no indication of reduced inflow to John Martin Reservoir and that the evaluation suggested a possible increase. The U.S.G.S. duly reported its findings to the Administration at a special meeting on August 6, 1981. Annual Report, Arkansas River Compact Administration 44-49, 51 (1981). In light of the fact that the

Administration has agreed to investigate the operation of Pueblo Reservoir, the Kansas complaint does not raise a substantial question justifying an original action in this Court.

E. There Is Little Likelihood Of Injury To Kansas If The Administration Proceeds With Its Investigation.

Finally, a relevant consideration in making a judgment as to the practical necessity of an original forum in this Court is whether any delay while the investigation by the Administration proceeds is likely to work to the substantial detriment of Kansas. *See Texas v. New Mexico,* 462 U.S. 554, 568-69 (1983). In this case, there is little likelihood of injury to Kansas in the immediate future.

Not all water that crosses the stateline is divertible or usable in Kansas. *See Colorado v. Kansas,* 320 U.S. 383, 396 (1943). Article IV.D. of the Compact provides: "This Compact is not intended to impede or prevent future beneficial development of the Arkansas River basin in Colorado . . . . Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction."

Even assuming that the Kansas allegations concerning post-compact developments in Colorado were true, those developments would not be in violation of Article IV.D. when those developments do not materially deplete the divertible and usable quantity of water available to water users in Kansas. In some years, more water crosses the stateline than is divertible or usable in Kansas. This has been the case in recent years. For example in 1985, the conservation pool in John Martin Reservoir[16] filled and excess water had to be released for flood control purposes. According to the records of the Operations Secretary for the Administration, the conservation pool is nearly full at the present time. Thus, there is little likelihood that Kansas could be injured in the immediate future if the investigation by the Administration continues.

---

[16]John Martin Reservoir is the storage space created by John Martin Dam. Art. III.D. The reservoir is located on the mainstem of the Arkansas River in Bent County, Colorado, approximately fifty-eight miles upstream from the Colorado-Kansas stateline. Arkansas River Compact: ***Hearings on S. 1448 Before the Senate Comm. on Interior and Insular Affairs,*** 81st Cong., 1st Sess., 28, 32 (1949) (statement of General Hans Kramer, Retired, U.S. Representative, Arkansas River Compact Comm'n.). *See* attached Map of Arkansas River Basin. The reservoir had an original storage capacity of approximately 700,000 acre-feet, of which 420,000 acre-feet was initially allocated to water conservation. *Id.* at 33. A major purpose of the Compact was to apportion between Colorado and Kansas the benefits arising from the operation of the reservoir for conservation purposes. Art. I.A.

CONCLUSION

Colorado concludes by noting this Court's admonition in *Texas v. New Mexico,* 462 U.S. 554 (1983):

> Time and again we have counselled States engaged in litigation with one another before this Court that their dispute 'is one more likely to be wisely solved by co-operative study and by conference and mutual concession on the part of the representatives of the States which are so vitally interested than by proceedings in any court however constituted.'. . .

Id. at 575 (citations omitted).

The principal allegation in the proposed complaint is that post-compact well development in Colorado has materially depleted the usable stateline flow of the Arkansas River in violation of Article IV.D. of the Compact. Investigation of this allegation calls for a high degree of expert and technical knowledge. However, even experts who are trained and experienced in conducting hydrologic investigations can differ in their interpretation of the technical facts. Colorado believes the Court should be sensitive to charges that one state or the other is using an investigation for the purpose of delay; but, in this case, Colorado does not believe the facts are susceptible to that construction. At bottom, the Kansas Attorney General simply disagreed with the cooperative approach to the investigation which the Administration adopted at its meeting on October 8, 1985. In Colorado's view, the Administration, unlike the Kansas Attorney General, recognized that the dispute was more likely to be "wisely solved" by a cooperative study than by litigation.

For the foregoing reasons, Colorado respectfully moves the Court to deny the motion for leave to file the complaint.

Respectfully submitted,

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APPENDIX A

REMARKS OF THE U.S. REPRESENTATIVE TO THE ARKANSAS RIVER COMPACT ADMINISTRATION AT THE ANNUAL MEETING OF THE ADMINISTRATION HELD IN PUEBLO, COLORADO (DEC. 10, 1985)

The purpose of the Compact Administration is to settle disputes between Colorado and Kansas on the Arkansas River and to divide and apportion the waters of the river in an equitable manner.

Any suit brought in the Supreme Court of the United States by one state against another concerning the Arkansas necessarily reflects failure of the Compact Administration and demonstrates a breakdown both of the Administration and the settlement processes that the Administration was created to perform.

Attorney General Stephan reported to the Kansas Legislature that a concerted effort was made in 1984 by Kansas to submit its concerns on the Arkansas River to arbitration with Colorado but that the effort proved fruitless. He stated that there have been three years of efforts to attempt to negotiate, arbitrate or investigate Kansas concerns with Colorado, but, without success, and that he has directed Assistant Attorney General John Campbell and Mr. Simms to prepare the legal documents necessary to initiate litigation against the State of Colorado.

It is my view, from the position to which I have been appointed, that three elements should be necessary to establish a threshold for a suit by one state against another before the Supreme Court of the United States on a compact dispute. If there is a failure of a compact commission to resolve a dispute where the compact had provision for allowing federal representatives a vote (not the case here) or providing for arbitration by federal official (as is the case with this compact) these elements seem appropriate.

First, the underlying factual basis of any dispute should be presented clearly and fully before a regular meeting of the Compact. The claim for relief or the basis for a complaint should be set forth in public and brought before a meeting of the Compact so that the Compact has the opportunity and, indeed, the duty fully to discuss and consider the subject of discord, the claim of injury or damage. The basis of the complaint should be presented at a public meeting and not a closed or informal session or in a committee meeting or in reports not brought to the compact itself.

We have consistently had a large attendance of interested water users and water authorities at the meetings of the Compact Administration. The water community of both states is entitled to hear the complaint of either. Indeed, it is my opinion that the deficiencies in the presentation of problems in the administration of the river and before the general public has caused delays in facing and defining the problems, in solution of these problems, if not exacerbation of the problems themselves. The public is entitled to the airing of the positions of both states and the airing of these problems is the first step towards the solution of the problems. This is a step that may not be ignored or omitted or slighted under the provisions of the Compact as I interpret its purpose and function.

Parliamentary procedures and the fine tuning of resolutions are a necessary part of the functions and deliberations of the Arkansas River Compact Administration, but they are not its principal business. Its principal business is the settlement of disputes, complaints, or grievances or maladministration or claims of injury or damage. These must be identified with specificity and clarity before the Compact Administration if they are to be resolved by the Compact Administration. There is a desire for a temperate and pleasant meeting, but if a suit is in the air, it should come before the Compact prior to being taken to court.

Second, the fact finding process must be pursued to the reasonable limit by both states in order that disputes be resolved. This process has been employed with substantial success and progress by both states in the past year. The Compact has in the past successfully pressed forward on the establishment of facts, a data base, and in resolution of the concerns of both states in the administration of the Arkansas River based upon the factual determinations made. In addition, the Compact has been successful in its special relationships with the agencies of the United States in obtaining studies and reports, some of which have been of great value. I point out particularly the "travel time study" which has become a useful working tool for the administration of the river.

It is not appropriate for me to comment upon or pass judgment upon the deficiences of the fact finding process which appeared in the past few months. If one state refuses to permit fact finding on a practice deemed by the other state to be the cause of great injury, then the process breaks down at that point. This may be the case here. It is appropriate for me to say that both states must make greater efforts to define and to agree upon all of the regime of the Arkansas river and upon the data, the data base, and the facts of operation of the structures in the basin as they may bear upon the regimen and operation of the river and upon the complaints of any state. I believe many of these factual bases have been readily and freely agreed to by the states. In some instances, the facts have been agreed to but we may have fallen short upon the appropriate interpretation of the factual bases.

Third, in the event of the failure to agree between the two states, it is necessary and, indeed, essential that there be an arbitration of the dispute. At the minimum the states should exhaust the arbitration process. The Supreme Court of the United States in Texas vs. New Mexico at 103 S.Ct. 2571 stated that: "Time and again we have counselled States engaged in

litigation with one another before this Court that their dispute 'is one more likely to be wisely solved by cooperative study and by conference and mutual concession on the part of the representatives of the States which are vitally interested than by proceedings in any court however constituted.' " A case given to the Supreme Court from a dispute over an interstate stream almost invariably ends up before a special master who may or may not have the qualifications, expertise, and experience appropriate to determine those matters. The court would acknowledge that there is in regular attendance before this Administration a group of men with skill, judgment, knowledge and experience superior to any other group on the complex issues of the river. The skills and abilities here should be utilized. In any event, before the compact's functions are at an end there must be a genuine effort to resolve disputes by arbitration.

One of the functions of the administration is to refer matters for arbitration. This necessarily involves several steps. One, is the establishment of the ground rules for arbitration of disputes before the Compact Administration. This step has not been taken. Cogent and thorough arbitration procedures have not been submitted by either state for action by the Compact to my knowledge. There have been discussions about arbitration, but I know of no framework which has been established by the Administration.

Next, those matters to be subjected to arbitration must be defined with clarity and precision. The arbitration procedure must run its course. These steps have not been accomplished in my judgment. It is not my intention to frustrate or thwart the remedy of either state, much less to define what those remedies shall be. It is my purpose to set forth those procedures which appear to me clearly to be reasonable and necessary before either successfully claims that its administrative remedies have been exhausted and that it must seek relief outside or beyond the Compact Administration.

APPENDIX B

RESOLUTION OF THE ARKANSAS RIVER COMPACT ADMINISTRATION REGARDING CONTINUED INVESTIGATION OF ALLEGED COMPACT VIOLATIONS SET FORTH IN THE RESOLUTION OF MARCH 28, 1985, AS AMENDED ON JULY 12, 1985

WHEREAS, pursuant to the Resolution of March 28, 1985, an Investigation Committee was constituted to investigate alleged violations of the Arkansas River Compact; and

WHEREAS, in conjunction with existing data and engineering studies the Committee agreed to prepare a series of single and double mass diagrams to analyze preliminarily the regimen of the Arkansas River; and

WHEREAS, the Colorado representative to the Investigation Committee has concluded that further investigation of whether the waters of the Arkansas River have been or are being materially depleted in usable quantity or availability should first examine: 1) reduced diversions by ditches in Colorado Water District 67; 2) the operating plan for John Martin Reservoir; 3) decreased plains precipitation; and 4) soil conservation measures; and

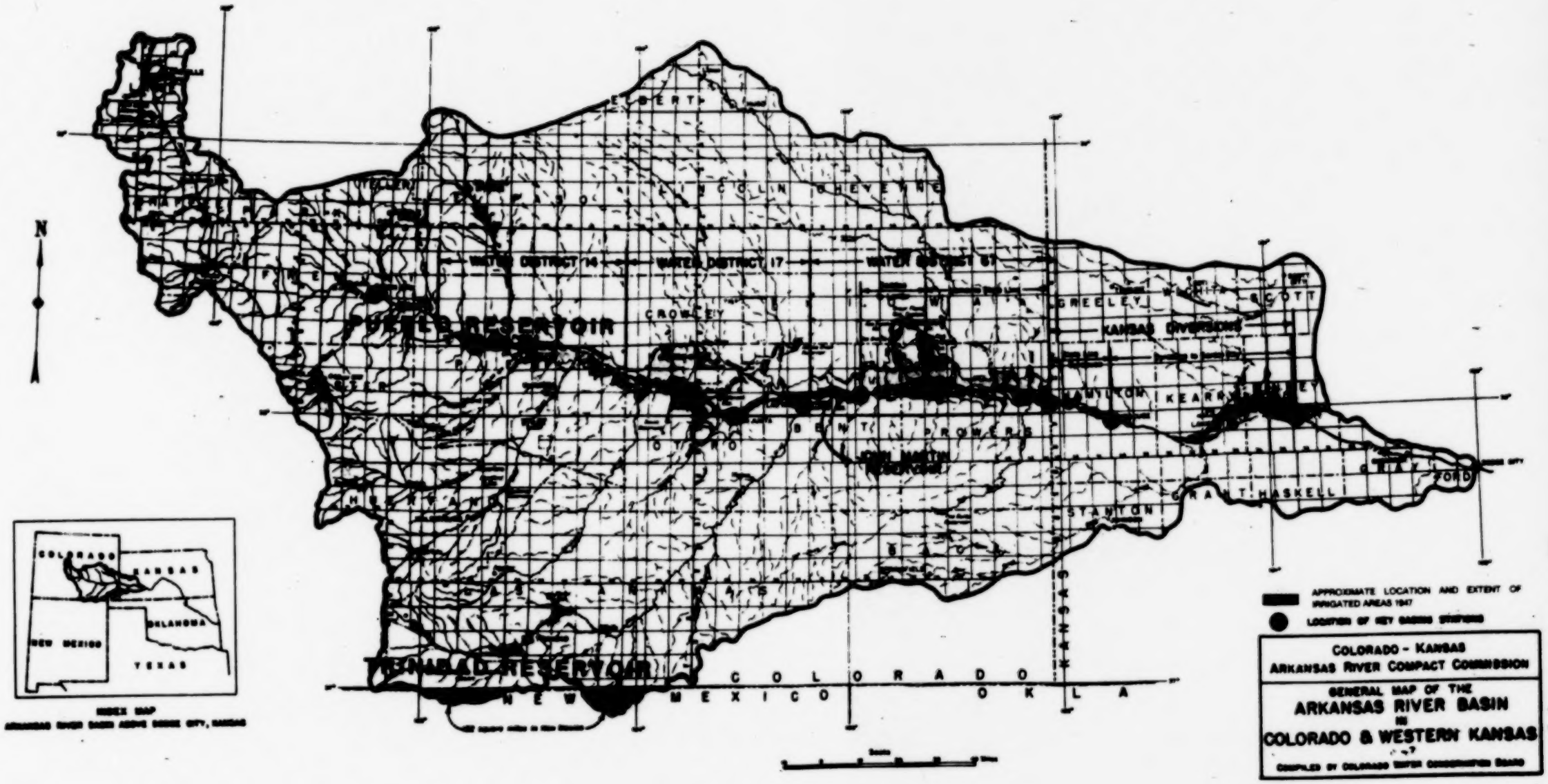
WHEREAS, the Kansas representative to the Investigation Committee has concluded that further investigation of whether the waters of the Arkansas River have been or are being materially depleted in usable quantity or availability should examine: 1) development and use of alluvial wells in Colorado; 2) precompact use of the conservation pool of John Martin Reservoir; 3) transmountain return flows; 4) post-compact development and use of upstream storage reservoirs; 5) tributary inflows and precipitation records; 6) extreme flood events and their impact on streamflow data; 7) surface diversions in Colorado Water Districts 67, 17, and 14; 8) development of stock

ponds in Colorado and their potential impact on tributary inflow to the Arkansas River; 9) the impacts of the 1980 Storage Resolution for John Martin Reservoir on the relationship of usable state line flows to upstream flows; and 10) tributary inflows from the eastern plains of Colorado;

NOW, THEREFORE, BE IT RESOLVED by the Arkansas River Compact Administration that the Investigation Committee constituted by the Resolution of March 28, 1985, as amended on July 12, 1985, shall continue with its investigation of the matters upon which the Committee has mutually agreed that further investigation should be undertaken.

The foregoing resolution was adopted by the Arkansas River Compact Administration at a special meeting held on October 8, 1985, in Garden City, Kansas.

Frank G. Cooley, Chairman	Leo Idler, Recording Secretary



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FILED
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No. 105, Original

IN THE

Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,
Plaintiff,

v.

STATE OF COLORADO,
Defendant.

MOTION FOR LEAVE TO FILE COMPLAINT OR ALTERNATIVELY TO COMPEL COMPLIANCE WITH ADMINISTRATIVE INVESTIGATION PURSUANT TO ARTICLE VIII(H) OF THE ARKANSAS RIVER COMPACT

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The plaintiff, State of Kansas, pursuant to Rules 9.6 and 28.1, hereby moves for an order granting plaintiff's motion for leave to file its complaint or, in the alternative, granting injunctive relief and an order compelling the defendant, State of Colorado, to comply with Article VIII(H) of the Arkansas River Compact. In support hereof, Kansas states:

1. The Arkansas River Compact was adopted in 1949 by the states of Colorado and Kansas to resolve existing and future controversies and to equitably apportion the waters of the Arkansas River. The Compact was approved and enacted into federal law by the Act of Congress of May 31, 1949, 63 Stat. 145.

2. Article VIII(H) of the Arkansas River Compact provides that:

> Violation of any of the provisions of this Compact or other actions prejudicial thereto which come to the attention of the Administration shall be promptly investigated by it. When deemed advisable as the result of such investigation, the Administration may report its findings and recommendations to the State official who is charged with the administration of water rights for appropriate action . . ..

3. Article VIII(I) provides that "[f]indings of fact made by the Administration shall not be conclusive in any court or before an agency or tribunal, but shall constitute prima facie evidence of the facts found."

4. Article VIII(D) provides that "[e]ach State shall have but one vote in the Administration and every decision, authorization or other action shall require unanimous vote."

5. Article VIII(D) further provides that "[t]he Administration may, by . . . unanimous vote, refer [any matter within the purview of the Administration] for arbitration . . .."

6. Through the actions of its officers, agents and political subdivisions, the State of Colorado and its water users have materially depleted the usable and available stateline flows of the Arkansas River since the adoption of the Compact.

7. The depletions by Colorado of usable stateline flows in violation of Article IV(D) of the Compact have been caused

primarily by the postcompact construction and operation of Trinidad Dam and Reservoir and Pueblo Dam and Reservoir, both of which are situated above John Martin Dam and Reservoir, the conservation structure just above the stateline upon which the Arkansas River Compact was conceptualized, and the proliferation of unregulated alluvial wells along the Arkansas River, essentially all of which are located above John Martin Dam and Reservoir.

8. All previous attempts by the states of Colorado and Kansas to negotiate, investigate, arbitrate, or settle Kansas' allegations of material depletion of stateline flows have been unsuccessful, terminated by Colorado's negative votes.

9. Following an investigation in 1981 of allegations by the State of Kansas that certain administrative practices in Colorado were violating Article IV(D) by materially depleting the usable water available for use in Kansas, the Compact Administration made findings of fact pursuant to Article VIII(H). The Administration's recommendation that the Colorado State Engineer immediately require the release of 18,290 acre feet of water unlawfully stored was defeated by the State of Colorado through its negative vote on the Resolution of January 4, 1982.

10. Through numerous meetings of representatives of the states during 1982, the State of Kansas sought to have various matters submitted to arbitration pursuant to Article VIII(D). At a special meeting of the Arkansas River Compact Administration on March 25, 1983, Kansas sought to submit to arbitration the matters that had been the subject of the Administration's investigation pursuant to Article VIII(H) in 1981. Exercising its prerogative to vote negatively, the State of Colorado refused to submit the matters to arbitration, maintaining that all questions of law and all questions of mixed fact and law were not conducive to arbitration. *See,*

Thirty-Fifth Annual Report, Arkansas River Compact Administration, 78, 85, 87-88 (1983). At the Administration's meeting of March 28, 1985, Colorado representatives expressed the view that the investigatory jurisdiction of the Administration pursuant to Article VIII(H) parallels the arbitration provision in Article VIII(D).

11. On March 28, 1985, after discussion and negotiation of allegations of Compact violations dating back to July 23, 1951, the Arkansas River Compact Administration formally resolved, "in accordance with Article VIII(H) . . . [to] promptly investigate:

> 1. Whether the waters of the Arkansas River have been or are being materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under the Compact by:
>
> a. the operation of the Trinidad Dam and Reservoir Project, Colorado,
>
> b. the operation of Pueblo Dam and Reservoir, Colorado, and the winter water storage program on the Arkansas River in Colorado,
>
> c. well development of the waters of the Arkansas River in Colorado, and
>
> d. well development of the waters of the Arkansas River in Kansas.
>
> 2. Whether water released from John Martin Dam and Reservoir has been stored in Lake McKinney, Kansas, rather than being applied promptly to beneficial use, without the prior authorization of the Administration; and
>
> 3. Whether there have been increases in ditch diversion rights from the Arkansas River by Kansas ditches between the Stateline and Garden City beyond the rights existing at the time of the execution of the Compact, which increases have occurred without the Administration first making findings of fact that the usable quantity and availability for use of the waters of the Arkansas River to water users in Colorado Water District 67 and Kansas would not be thereby materially depleted or adversely affected."

12. Notwithstanding the resolution of March 28, 1985, to conduct an administrative investigation of the enumerated allegations, Colorado took the position through its negative votes on six other resolutions proposed by Kansas that only the issue of alluvial well depletion was "subject and appropriate to arbitration pursuant to Article VIII(D) of the Arkansas River Compact."

13. Most of Colorado's depletion of usable stateline flows in violation of Article IV(D) results from diversions from unregulated, postcompact alluvial wells. For decades Colorado allowed the proliferation of unregulated wells in the Arkansas Valley, ignoring the adverse effects on surface water users, and refused to address the problem by curtailment and regulation of wells. *See, e.g.*, Hillhouse, "Survey of Colrado Water Law," 47 Denver L. J. 226 (1970); Comment, "Appropriation and Colorado's Ground Water: A Continuing Dilemma?", 40 U. Colo. L. Rev. 133 (1967); Hillhouse, "Ground and Surface Water In An Appropriation State," 20 Rocky Mountain Min. L. Inst. 691 (1975).

14. On October 4, 1985, after avoiding the command of the Administration's Resolution of March 28, 1985, to "promptly investigate . . . well development in Colorado," Colorado refused "at this time, . . . to undertake an investigation into well development in Colorado . . .." Memorandum from J. William McDonald, Colorado's representative on the

Investigation Committee, to the Arkansas River Compact Administration.

15. While Colorado has refused to participate in a prompt, bilateral investigation of depletions caused by well development in Colorado, as required by Article VIII(H), the Colorado legislature has funded and the Colorado water agencies have undertaken a unilateral investigation of the well development, and Colorado refused to make the information compiled for its study available to the Compact Administration.

16. Colorado has refused to consider the investigation of Kansas' allegations of Compact violation in regard to the operation of Trinidad Reservoir and the operation of Pueblo Reservoir.

17. Following an investigation of depletions of stateline flows using an engineering methodology which was mutually agreed could not identify or isolate the causes of indicated depletions, Kansas proposed the continued investigation of all of the allegations enumerated in the Resolution of March 28, 1985, which were to have been promptly investigated pursuant to Article VIII(H). Colorado refused to investigate the allegations and by Resolution of October 8, 1985, agreed to continue the investigation in four limited areas of potential depletion below John Martin Reservoir. Kansas' allegations of depletion in violation of Article IV(D) of the Compact relate almost exclusively to uses of water in Colorado above John Martin Reservoir.

18. On December 10, 1985, the State of Kansas sought for the third time to have Colorado cooperate in an investigation of its allegations as initially agreed to in the Administration's Resolution of March 28, 1985. Kansas moved that the Arkansas River Compact Administration:

> (1) . . . [R]equire the State of Colorado to furnish to the State of Kansas all information,

> records and data concerning alluvial well development in the Arkansas River basin, including the number and location of wells, annual quantities and rates of diversion, authorized number of acres irrigated, types and acres of crops irrigated and all other water use data available;
>
> (2) immediately undertake an investigation of the impact of postcompact well development and water use in the State of Colorado on the usable stateline flow of the Arkansas River and on the State of Kansas' equitable apportionment of the waters of the Arkansas River under the Compact;
>
> (3) recommend to the Colorado State Engineer that he terminate all postcompact well uses in the Arkansas River Basin of Colorado during the pendency of the Compact Administration's investigation of postcompact well development;
>
> (4) immediately undertake an investigation of the impact of past rollover of water in Trinidad Reservoir on the usable stateline flow of the Arkansas River and on the State of Kansas' equitable apportionment of the waters of the Arkansas River under the Compact;
>
> (5) require the State of Colorado to adhere to and act in accordance with the Compact Administration's Resolution of July 24, 1951, concerning reregulation, if any, of native waters of the Arkansas River in connection with Colorado's transmountain diversion under the Gunnison-Arkansas River Project; and
>
> (6) require the State of Colorado to provide to the Compact Administration's Investigation Committee its data, calculations and studies regarding use and depletion of its transmountain diversions in the Arkansas River Basin and to cooperate with

the State of Kansas in quantifying the amount of Colorado's transmountain return flow to the Arkansas River.

Colorado voted negatively, refusing again to investigate Kansas' allegations and precluding the Arkansas River Compact Administration from taking any meaningful action.

19. In light of Colorado's refusal to abide by the Administration's Resolution of March 28, 1985, to investigate Kansas' allegations of Compact violation, this suit was filed on December 16, 1985.

20. Colorado's continuing refusal to cooperate renders the administrative investigation ineffective and purposeless.

21. Compounding the fact that Colorado has rendered the administrative investigation ineffective and purposeless, Article VIII(H) provides only for discretionary recommendations, leaving the State of Kansas' remedy subject to the negative votes of the State of Colorado.

WHEREFORE, the State of Kansas prays:

1) That the Court grant Kansas' motion for leave to file its complaint or, in the alternative, that the Court order the State of Colorado to comply with Article VIII(H) of the Arkansas River Compact and the Arkansas River Compact Administration's Resolution of March 28, 1985, to promptly investigate all of Kansas' allegations of Compact violation;

2) that the Court enjoin all postcompact well uses in the Arkansas River Valley pending the completion of the Administration's investigation within a time certain; and

3) that the Court retain jurisdiction of this action pending the expeditious completion of the investigation by the Arkansas River Compact Administration.

Respectfully submitted,

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CERTIFICATE OF SERVICE

Pursuant to Rules 42(5) and 33 of the Supreme Court Rules, I certify that three copies of the foregoing motion were served upon counsel of record on March 3, 1986.

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REPLY BRIEF AND BRIEF IN SUPPORT OF MOTION FOR LEAVE TO FILE COMPLAINT OR ALTERNATIVELY TO COMPEL COMPLIANCE WITH ADMINISTRATIVE INVESTIGATION PURSUANT TO ARTICLE VIII(H) OF THE ARKANSAS RIVER COMPACT

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No. 105, Original

IN THE

Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,
Plaintiff,

v.

STATE OF COLORADO,
Defendant.

REPLY BRIEF AND BRIEF IN SUPPORT OF MOTION FOR LEAVE TO FILE COMPLAINT OR ALTERNATIVELY TO COMPEL COMPLIANCE WITH ADMINISTRATIVE INVESTIGATION PURSUANT TO ARTICLE VIII(H) OF THE ARKANSAS RIVER COMPACT

INTRODUCTION

Colorado has responded to Kansas' motion for leave to file its complaint by explaining that "Kansas has not made a reasonable effort to resolve this matter [administratively]" and by arguing that "Kansas has an adequate means for vindicating its concerns through a pending investigation by the

[Arkansas River Compact] Administration." Colorado's Brief in Opposition at 1. Based on the facts as related by Colorado, Colorado's position clearly comports with the principle that the Court will not entertain an otherwise justiciable action between states when an alternative forum or administrative remedy is available to the plaintiff state. *See, e.g., Massachusetts v. Missouri,* 308 U.S. 1, 19-20 (1939). Colorado, however, has not recited the essential facts, has dissembled those it did recite, and would mislead the Court into a decision to decline jurisdiction. The object of the reply is to relate the relevant facts, to apply them to the principle of administrative exhaustion, to reveal the unctuousness of Colorado's opposition to Kansas' motion for leave to file its complaint, and to support Kansas' alternative motion to compel compliance with the Arkansas River Compact Administration's Resolution of March 28, 1985, made pursuant to Article VIII(H) of the Compact.

STATEMENT OF FACTS

Colorado divides its statement of facts into two parts, those relating to the administrative investigation which was conducted pursuant to the Resolution of March 28, 1985, and "background facts" relating to the history of Colorado's regulation of ground water. With regard to the administrative investigation, Colorado imparts the spurious view that the committee functioned harmoniously since April, 1985, "to determine if there had been any changes in the relationship between streamflows at selected locations in the Arkansas River Basin." Brief in Opposition at 4. Colorado also suggests that Kansas' amendment on July 12, 1985 of the Resolution of March 28, 1985, interrupted the investigatory process and raised new issues. Colorado then explains that "extensive reports" were submitted and that the "Administration expressly authorized the committee to 'continue with its investigation of the matters upon

which the Committee has mutually agreed that further investigation should be undertaken,'" suggesting to the Court that the resolution reaffirmed that the administrative investigation was operating smoothly and it should continue.[1] *Id.*

In contrast to this sanguine picture, Colorado juxtaposes the Kansas Attorney General's announcement that suit would be filed on December 16, 1985, suggesting that his ostensibly maverick actions differ sharply from the prudent course sought to be followed by the Arkansas River Compact Administration.

ADMINISTRATION OF COLORADO WATER LAW

With regard to the "background facts," Colorado explains that the Colorado State Engineer was justified in believing that he had no authority prior to 1965 to regulate ground water diversions and that in 1965 the Colorado legislature acted expeditiously to provide the State Engineer with "clear" authority. Armed with this newfound authority, according to Colorado, the State Engineer promptly set out to curtail the use of alluvial wells along the Arkansas River. Despite the good intentions of the State Engineer, however, the Colorado Supreme Court found his regulatory effort unconstitutional, which motivated immediate action by the legislature to investigate the need for legislation which would accommodate

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[1] Contrary to Colorado's assertion, the United States' Representative to the Compact Administration did not conclude that Kansas has not followed administrative procedures. Indeed, Colorado takes the language it quotes out of the context of arbitration, not administrative investigation. As to the latter, the United States' Representative stated that "[i]f one state refuses to permit fact finding on a practice deemed by the other state to be the cause of great injury, then the process breaks down at that point. This may be the case here." *See,* Minutes of Annual Meeting of the Arkansas River Compact Administration, December 10, 1985 at 69.

the integrated administration of surface and ground water. This investigation, according to Colorado, resulted in the enactment of the Water Rights Determination and Administration Act of 1969, which in turn led to the promulgation in 1972 of rules and regulations to curtail ground water uses in the Arkansas River Valley. Additionally, according to Colorado, the State Engineer proposed an amendment in 1974 to further curtail ground water uses, which was rejected by the Colorado Supreme Court. According to Colorado, its Supreme Court determined that there was no substance to the contention that ground water diversions had depleted the flows of the Arkansas River.

There is a grain of truth in everything Colorado has said, almost. The actual history of Colorado's regulation of ground water diversions explains its refusal to consider the adverse effects of postcompact well development on stateline flows.

For decades Colorado allowed the proliferation of unregulated wells in the Arkansas Valley, ignoring the inevitable effect on surface water users. *See, Survey of Colorado Water Law*, 47 Denver L.J. 226, 322-24 (1970); Hillhouse, *Ground and Surface Water In An Appropriation State*, 20 Rocky Mtn. Min.L.Inst. 691, 696-97 (1975). Colorado refused to address the problem, fearing that agricultural interests would be hurt by any curtailment or regulation of wells. *See, Survey of Colorado Water Law*, 47 Denver L.J. at 323; Hillhouse, 20 Rocky Mtn.Min.L.Inst. at 697. The Colorado Legislative Council was outspoken about the fact that political pressure was the true reason that nothing was done to curtail the well development. *See, Implementation of 1965 Water Legislation XXV*, Research Pub. No. 114 (1966).

Despite the fact that the State Engineer had unequivocal authority to regulate wells, he used the alleged lack of authority as an excuse to avoid a sensitive political issue and took no

action.[2] The result was a staggering increase in the number of wells, as irrigators "rush[ed] to board Colorado's underground

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[2] If no other relevant law existed in Colorado, the Arkansas River Compact, Colo. Rev. Stat. Section 149-9-1 (1963), provided all the authority the State Engineer needed to prevent the depletion of surface flows by ground water diversions. *See*, Report of the Special Master, *Texas v. New Mexico*, 446 U.S. 540 (1979); *Hinderlider v. La Plata and Cherry Creek Ditch Co.*, 304 U.S. 92 (1938).

There were other existing laws, however. In *Fellhauer v. People*, 447 P.2d 986 (Colo. 1968), the first well curtailment case on the Arkansas River, the Colorado Attorney General and the intervening Arkansas surface water users took the position that the State Engineer had had the authority to regulate wells long before the 1965 act which ostensibly provided the necessary authority for the first time. Strongly hinting its agreement with this view, the Colorado Supreme Court quoted Benjamin F. Stapleton, Jr., the chairman of the Colorado Water Conservation Board:

> * * * House Bill 1066 [the 1965 act], merely gave the State Engineer the right to shut down wells. House Bill 1066 was, in my opinion, superfluous since the State Engineer had not only the right but the responsibility under then-existing laws to shut down wells which were interfering with the prior rights of other water users. The State Engineer insisted that he had no authority and to force the State Engineer to take action on these matters existing laws were amended to make what was already crystal clear even more self-evident by specific command to the State Engineer to take action against well owners in the operation and management of the total water resources of the state.
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> * * * * * * *
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> I have always believed that the State Engineer had the authority to shut down wells if they were interfering with the rights of senior appropriators and yet, because shutting down a well is always controversial, no action was taken by the State Engineer, acting on the excuse that he had no authority under state laws.

Id. at 990.

Cont. p. 6

waterwagon." Comment, *Appropriation and Colorado's Ground Water: A Continuing Dilemma?*, 40 U.Colo.L.Rev. 133, 134-36 (1967).

In 1965, after nearly twenty years of well development which had been ignored by the State of Colorado, numerous Arkansas River Ditch Associations petitioned the State Engineer, demanding well diversions be curtailed in order to stop

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Footnote 2, Cont.

The existing law Chairman Stapleton was referring to was Article XVI, Section 5 of the Colorado Constitution, which provides that all ground water is presumed tributary to surface flow, and a conspicuous body of case law standing for the proposition that the doctrine of prior appropriation applies to tributary groundwater. *See, e.g., Colorado Springs v. Bender,* 148 Colo. 458, 461-62, 366 P.2d 552, 555 (1961); *Black v. Taylor,* 128 Colo. 449, 459, 264 P.2d 502, 507 (1953); *Safranek v. Town of Limon,* 123 Colo. 334, 228 P.2d 975, 977 (1951); *De Haas v. Benesch,* 116 Colo. 344, 350-51, 181 P.2d 453, 456 (1947); *Lomas v. Webster,* 109 Colo. 107, 110, 122 P.2d 248, 250 (1942); *Dalpez v. Nix,* 96 Colo. 540, 549, 45 P.2d 176, 180 (1935); *Faden v. Hubbell,* 93 Colo. 358, 369, 28 P.2d 247, 251 (1933); *Nevius v. Smith,* 86 Colo. 178, 182, 279 P. 44, 45 (1929); *Comrie v. Sweet,* 75 Colo. 199, 201, 225 P. 214, 215 (1924); *Ft. Morgan Reservoir & Irr. Co. v. McCune,* 71 Colo. 256, 206 P. 393, 394 (1922); *Rio Grande Reservoir & Ditch Co. v. Wagon Wheel Gap Improvement Co.,* 68 Colo. 437, 444, 191 P. 129, 131 (1920); *Trowel Land & Irr. Co. v. Bijou Irr. Dist.,* 65 Colo. 202, 216, 176 P. 292, 296 (1918); *Durkee Ditch Co. v. Means,* 63 Colo. 6, 8, 164 P. 503, 504 (1917); *Comstock v. Ramsay,* 55 Colo. 244, 255-56, 133 P. 1107, 1110 (1913); *La Jara Creamery & Live Stock Ass'n. v. Hansen,* 35 Colo. 105, 109, 83 P. 644, 645 (1905); *Ogilvy Irrigating & Land Co. v. Insinger,* 19 Colo. App. 380, 386-87, 75 P. 598, 599 (1904); *Buckers Irr., Mill. & Imp. Co. v. Farmers' Independent Ditch Co.,* 31 Colo. 62, 71, 72 P. 49, 52 (1902); *Platte Valley Irr. Co. v. Buckers Irr., Mill. & Imp. Co.,* 25 Colo. 77, 82, 53 P. 334, 336 (1898); *Bruening v. Dorr,* 23 Colo. 195, 197-98, 47 P. 290, 292 (1896); *McClellan v. Hurdle,* 3 Colo. App. 430, 33 P. 280 (1893).

depletions of surface flows. Following the State Engineer's refusal to act, H. B. 1066 was enacted in 1965 to force the State Engineer to "execute and administer the laws of the state relative to the distribution of the surface waters of the state including the underground waters tributary thereto in accordance with the right of priority of appropriation." Colo. Rev. Stat. Section 148-11-22(1) (Supp. 1965); *see also, Proceedings of the Joint Session* 1-8, Mineral Law & Water Law Sections, Colorado Bar Assoc. (October 15, 1966).

The long overdue legislation was not popular with farmers:

> [I]n the absence of any other specific statutory language prior to 1965, individual farmers in Colorado invested thousands of dollars in developing underground water as a source of supply for their crops. It is no wonder, then, that . . . House Bill No. 1066 . . . was considered as a threat to their personal livelihood and a taking of their property without due process of law . . .. [I]t is not surprising that many persons view the . . . action in 1965 with deep-felt bitterness and resentment, when the main thing wrong with this legislation is that it was enacted some 20 or 30 years later than it should have been.

47 Denver L.J. at 323.

As of 1967 the State Engineer still had not promulgated any rules and regulations. In a forthright decision in 1967, the district court enjoined one farmer, Roger Fellhauer, from pumping his alluvial wells because there was no unappropriated water in the Arkansas system. Concerned with the district court's decision and fearing that it may have gone dangerously far toward actual priority administration in H. B. 1066, the legislature passed S. 407 in 1967, while *Fellhauer* was pending appeal. The new legislation called for an investigation of well

depletion and an evaluation of additional legislation.[3] *See*, 47 Colo. L. Rev. at 327-28. Shortly thereafter, Roger Fellhauer persuaded the Colorado Supreme Court that H. B. 1066 was unconstitutional. *See, Fellhauer v. People*, 447 P.2d 986 (Colo. 1968).

Based on this spotted history "[t]he National Water Commission found Colorado's experience in dealing with physically integrated ground and surface waters a persuasive argument why other states should develop legal systems providing for their coordinated administration as soon as possible." Hillhouse, 20 Rocky Mtn.Min.L.Inst. at 691, *quoting* National Water Commission, *Water Policies for the Future* 233, Final Report to the President and to the Congress of the United States (1973).

Against this background, Colorado's refusal to even consider Kansas' claim that the wells in the Arkansas Valley are depleting stateline surface flows demonstrates Colorado's attempt to bury a problem that has plagued the state for decades. While Colorado would have the Court believe that well depletion is imaginary, it is in fact very real, and Colorado's refusal to

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[3] In its Brief in Opposition , Colorado cites one of the studies done pursuant to S. 407, *i.e.*, W. W. Wheeler and Associates and Woodward – Clyde & Associates, *Water Legislation Investigations for the Arkansas River Basin in Colorado* (1968). Brief in Opposition at 5. There was no apparent reason for Colorado's reference to the study, especially in light of its principal conclusion that "[t]he use of wells in recent years has materially decreased the surface flow available to direct flow and storage rights." *See*, Vol. I, Summary Report at 3.

consider it exemplifies its desire to confound any meaningful investigation by the Arkansas River Administration.[4]

ADMINISTRATIVE INVESTIGATION OF DEPLETIONS OF SURFACE FLOWS BY WELLS

Colorado's explanation of the history and the efficacy of the Compact Administration's investigation pursuant to Article VIII(H) and the Resolution of March 28, 1985, is equally disingenuous.

First, Colorado states that:

> Kansas admits, however, that the well development of which it complains occurred almost exclusively *prior to 1965*. Nevertheless, and despite its allegation that since 1974 there has been a substantial decrease in usable stateline flows, it was not until March 28, 1985, that Kansas *for the first time*, requested the Administration to investigate whether well development in Colorado had caused material depletion to the waters of the Arkansas River. The Kansas brief implies that well development in Colorado had been the subject of discussion by the Administration for several years . . ..

Brief in Opposition at 9-10 (citations omitted) (emphasis in original).

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[4] In 1966 there was insufficient Arkansas River water to satisfy 1887 priorities. In the Colorado State Engineer's valiant effort to remedy the problem, he sought to enjoin 39 out of some 2,000 wells in only two of Colorado's 13 water districts. The Division Engineer on the Arkansas River didn't mince words when he described the lack of enthusiasm; all of the valley wells were not shut down "because you are going to affect the economy of the valley." *Fellhauer*, 447 P.2d at 992.

The implication Colorado offers the Court is that Kansas has sat on its hands, idly watching the stateline flows decline over the years.[5]

The actual history is quite the contrary. As early as its meeting on December 11, 1956, "[t]he Administration held considerable discussion concerning the activity of well drilling and its effect on conditions." *Minutes of Annual Meeting*, December 11, 1956 at 15. Since then, well depletion has been discussed, both formally and informally, at numerous meetings of the Compact Administration. On April 23, 1977, Mr. Harry Bates, a member of the Buffalo Mutual Irrigation Co. and Colorado's Compact Administration representative from District 67, submitted a memorandum to the Arkansas River Compact Administration regarding "problems concerning storage in John Martin Reservoir."[6] After noting that "the most recent 10 year average shows a decline of over 54,000 a.ft. [in storage] from that of the first 10 years of Compact operation, Mr. Bates reported "that the most probable causes are as follows:

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[5] Even Colorado agrees that the stateline flows "declined substantially" beginning in 1974. *See,* J. W. McDonald, *Report to Investigation Committee of the Arkansas River Compact Administration* (September 6, 1985). The most recent study of depletions in Colorado of stateline flows concludes that "[s]treamflow at the Kansas stateline has been reduced significantly since 1949 due to increased consumption of water in Colorado" and "[a]ctual and usable streamflows at the stateline during the period 1974 to 1983 are significantly less than those that occurred during the pre-compact period and during the post-compact period up to 1974." S. S. Papadopulos & Associates, Inc., *Status Report on Evaluations of Streamflow Depletions Along the Arkansas River* (February 17, 1986).

[6] District 67 is the area below John Martin Reservoir, encompassing the water uses in the 60 miles stretch to the stateline. Because of the location of the District, its interests are often the same as those of Kansas.

1. Heavy increase in winter irrigation during the months of November thru March by water users in Colorado Water Districts 14 and 17 upstream from John Martin Dam.

2. A proliferation of wells pumping from the aquifer hydraulically connected to the live river stream above John Martin.

3. Transfer of some water rights from agricultural use to municipal and industrial use.

4. Recently, a re-regulation of river flow by Pueblo Reservoir. This re-regulation will be amplified by operation of the Trinidad Dam.

5. Increase in phreatophyrtic growth along the river.

6. Less run-off because of increase in contour terracing, stock water ponds, range land pitting, and other conservation practices."

Id. at 1-2.

Quantitatively, the most significant depletion resulted from ground water diversions. *Minutes of Annual Meeting*, December 12, 1978, at 11-12.[7]

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[7] In his memorandum, Mr. Bates recognized that he was confronting upstream Colorado users, but nevertheless recommended that the Administration investigate the problem. He was replaced on August 16, 1977.

While Mr. Bates was outspoken, he was not alone. In the 1960's, Colorado farmers like Frank Milenski, one of the valley's pre-eminent experts on the history of water use, lobbied state politicians to curb the drilling of wells, which in effect gave relative newcomers along the river access to his 19th century water right. Kansas City Star, February 23, 1986, at 14A.

While the issue of well depletions was discussed with growing frequency in the 1970s, this issue and others were the subject of many meetings and exchanges of correspondence between engineers and the Attorneys General of the respective states. These discussions were cited in Attorney General Stephans' letter of February 26, 1985 to Colorado Attorney General Duane Woodard:

> You will recall that in the late 1970s certain administrative practices above John Martin Reservoir in Colorado generated considerable concern on the part of the Kansas delegation to the Arkansas River Compact Administration. Numerous special and regular meetings of the Administration were devoted to discussion of the problems, but essentially no progress was made toward their resolution. On August 31, 1982, your predecessor and I met with the agency and compact officials to further clarify the issues that had stalemated the Administration. Our participation, however, was not particularly fruitful. While the Administration meetings continued to conclude with an exchange of negative votes on the respective delegations' attempts to resolve the issues, we recited the states' positions in a protracted exchange of correspondence. The discussions ended with an unsuccessful attempt by Kansas to initiate arbitration pursuant to Article VIII(D) of the Compact.

Having been repeatedly discouraged over the years by the State of Colorado's proven disinclination either to acknowledge or to do anything about the continuing depletions of surface flows by wells, the State of Kansas contracted with Simons, Li & Associates, Inc. on September 26, 1983 to study the depletions in relation to Colorado's obligations under the

Arkansas River Compact. Noting that "[w]ell depletions in Colorado have been estimated to be from 150,000 to 200,000 acre-feet per year, according to the Colorado State Engineer and others," Simons, Li & Associates concluded that "[s]ince 1974 . . . usable flows have declined to about 45 percent of pre-compact values . . . [and] well development in Colorado has caused approximately 150,000 acre-feet per year of depletions to the Arkansas River." *Preliminary Assessment – Development and Administration of Water Resources of the Arkansas River* at iv.

While Colorado's suggestion to the Court "that well development in Colorado had [not] been the subject of discussion by the Administration [in previous] years" is belied by the history, its factual assertion that "[t]he Colorado representatives did not refuse to investigate the substance of the Kansas allegation concerning well development in Colorado" is flatly wrong. Brief in Opposition at 10-11.

To support its statement, Colorado claims the issue is "what to investigate first," and blithely concludes that only changes in plains precipitation need be investigated. Its "conclusion" that declines in eastern plains precipitation are the cause of the declines in usable stateline flows derives from the Investigation Committee's use of a technique called "mass diagram analysis." Mass analysis is useful in determining trends over long periods of time, but "it should be emphasized," in Colorado's words, that:

> . . . they do not explain the reasons for trends or changes in the relationship between two sets of streamflow data. Such changes may be due to inherent variability of hydrologic data, changes in record-keeping methods, or many other factors. Likewise, the mere fact that there is no change in the relationship between two sets of streamflow data does not necessarily mean that

> no real change in the relationship has occurred or that there is a causal connection between the two sets of data.

J. W. McDonald, [Colorado's] *Report to Investigation Committee of the Arkansas River Compact Administration* 1 (September 6, 1985).

Despite the agreement of Kansas and Colorado that causes of declines in flows cannot be identified or isolated by the technique, Colorado concluded that the decline in flows shown by the Investigation Committee's mass analysis "was directly related to a decline in tributary inflow from plains drainage areas . . .." J. W. McDonald, *Memorandum to Arkansas River Compact Administration* (October 4, 1985) at 19.

It is clear that Colorado's attempt to isolate the causes of depletions in stateline flows and to restrict the administrative investigation to those causes cannot be justified. When this precise issue was addressed by recognized experts, it was concluded that postcompact well development in Colorado has unquestionably materially depleted the Arkansas River and that Colorado's purposeful attempt to avoid study of well depletions is not remotely justifiable on the basis of any hydrologic or engineering reason. *See*, S. S. Papadopulos & Associates, Inc., *Report to the Arkansas River Compact Administration Regarding the Article VIII(H) Investigation of Alleged Violations of the Arkansas River Compact* (December 6, 1985). If the Administration's investigation is to be meaningful, all possible causes of depletion to stateline flows must be investigated.

Aside from sound engineering practice, the language of the Compact in regard to administrative investigations is unambiguous and mandatory: "Violation of any of the provisions of this Compact . . . which come to the attention of the Administration shall be promptly investigated by it." Article VIII(H).

Notwithstanding the mandate of the Compact, Colorado refused to proceed to investigate depletions by wells and five other areas in the Resolution of October 8, 1985.[8] That resolution was *not* a bilateral affirmation that the investigation should proceed, but rather a unilateral rejection of the investigation in essentially all of the areas deemed crucial by the State of Kansas.

KANSAS' OTHER ALLEGATIONS OF MATERIAL DEPLETION

Colorado has also maintained that "[o]ther matters raised by Kansas do not justify an original forum in this Court." Brief in Opposition at 17. The other matters are: 1) the operation of Trinidad Reservoir; 2) Colorado's refusal to quantify transmountain return flows, and 3) Colorado's refusal to abide by the Resolution of July 24, 1951. While Colorado refuses to consider these matters, Kansas has maintained that they must be investigated.

With regard to Trinidad, the matter was initially investigated in 1981, and the Administration's recommendation that the Colorado State Engineer immediately release 18,290 acre feet of water unlawfully stored was defeated by Colorado's negative vote on the Resolution of January 4, 1982. The same issue is

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8 Anomalously, while Colorado has refused to participate in a prompt, bilateral investigation of depletions caused by well development in Colorado, as required by Article VIII(H), the Colorado legislature has funded and the Colorado water agencies have undertaken a unilateral investigation of the well development, refusing to make the information compiled for its study available to the Compact Administration.

Colorado has also expressed an interest in investigating alleged depletions of surface flows by wells in Kansas. In other words, Kansas wells deplete the flow of the river but Colorado wells don't.

being addressed by the U.S. Bureau of Reclamation now, and the Bureau has agreed with Kansas that Colorado has stored large amounts of water in Trinidad in violation of the Reservoir's Operating Principles. Colorado's statement that "Kansas has adequate means to address its concerns . . . through the review process being conducted by the . . . Bureau" is incorrect. The Bureau has no power to force Colorado to vote affirmatively.

Transmountain return flows present another sensitive issue. Colorado admits that it refuses to investigate transmountain return flows, but characterizes the issue as "a hypothetical controversy which is not ripe for adjudication." Brief in Opposition at 19. Return flows need to be investigated, however, for two reasons. First, in all of the mass analyses that have been performed, the transmountain water in the Arkansas River has been arithmetically removed from the upstream gages, while the return flows, as a matter of fact, contribute to the regimen of the river and have not been quantified and arithmetically removed from the downstream gages. The result is that the actual depletion of stateline flows is greater than shown by the administrative investigation by the amount of the returns. Secondly, Colorado refuses to quantify the returns because they may be fully consumed by the importer under Colorado law. Kansas is interested in preventing any further consumption of the returns because they represent wet water that could be used to offset Colorado's failure to meet its Compact obligations.[9]

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[9] The real reason Colorado refuses to cooperate is to buy the time needed for its courts to approve programs of return flow utilization. *See, e.g.*, the Application of Colorado Springs in Water Division No. 2, No. 84-CW-179. The object is to sanction the programs with court decrees, thus adding the inertia thought sufficient to prevent this Court from awarding the water to Kansas in lieu of interfering with the economy derived from well pumping.

With regard to Colorado's refusal to abide by the Administration's Resolution of July 24, 1951, Colorado tries to explain that "the resolution expressed [only] a policy . . . that there be no reregulation of native waters of the Arkansas River . . . until a plan of operation had been submitted to and approved by the Administration." Brief in Opposition at 19. The resolution, however, was the consideration for Kansas' approval of the Gunnison-Arkansas Project, its object being to assure that any reregulation of native water in Arkansas River storage structures would not undermine the mutual rights and obligations set out in the Compact. *See, e.g.*, Senate Report No. 1742, 87th Congress, 2d Sess., July 19, 1962. The federal representative to the Compact Administration agrees with Kansas and with Congress that reregulation "require[s] consideration by the Compact Administration." F. G. Cooley, Letter to the Arkansas River Compact Administration (January 14, 1985).

ARGUMENT

In the Court's second decision in *Texas v. New Mexico*, 462 U.S. 554 (1983), it was recognized that when an interstate compact commission is not able to act, the dispute will be considered by the Court.[10] This is consistent with the rule

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[10] The doctrine of primary jurisdiction does not apply to this case. That doctrine is concerned with placement of a case in the proper initial forum. *See, United States v. Western Pacific R. Co.*, 352 U.S. 59 (1956). Here, it is undisputed that the Administration is the proper initial forum. The dispute is whether, in light of Colorado's unjustified refusal to investigate all of Kansas' allegations, the case should continue in that forum. That is an administrative exhaustion issue.

The doctrine of primary jurisdiction does not apply for another reason. As *Texas & Pacific Railway v. Abilene Cotton Oil Co.*, 204 U.S. 426 (1907) demonstrates, an underlying assumption of the doctrine is that the administrative agency is able to act, render a decision, and award

Cont. p. 18

that a litigant need not resort to administrative remedies when they would be futile. *See, Moore v. East Cleveland*, 431 U.S. 526 (1977) (dissenting opinion); *see also, Aleknagik Natives v. Andrus*, 648 F.2d 496 (9th Cir. 1980). Nor has the Court required administrative exhaustion if administrative relief is inadequate. *Aircraft & Diesel Corp. v. Hirsch*, 331 U.S. 752 (1947). Administrative relief may be inadequate if, although it is adequate in theory, it is not available in practice. *See, McNeese v. Board of Education*, 373 U.S. 668 (1963). If the Court finds that awaiting the agency decision would "put aside substance for needless ceremony," administrative exhaustion will not be required. *Smith v. Ill. Bell Tel. Co.*, 270 U.S. 587 (1926).

As the actual history of Compact administration and investigation demonstrates, Kansas has attempted to invoke and exhaust all potential administrative remedies. The problem has been Colorado's refusal to heed the mandate of Article VIII(H) and to cooperate in a meaningful way. In this regard, the State of Kansas is still willing to participate in a continued administrative investigation, but only if Colorado is compelled "to promptly investigate" all of Kansas' allegations of compact violation.

In 1980, the Court amended Rule 9 to expressly provide that it is free with respect to a motion for leave to file to "grant or deny the motion, set it down for argument, *or take other appropriate action.*" Moore, *Federal Practice*, Paragraph 809.05 (emphasis added). Kansas suggests that appropriate action would be an order compelling Colorado to promptly

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Footnote 10, Cont.

the relief sought. In *Texas & Pacific*, the Interstate Commerce Commission was able to impartially consider all evidence and bring the case to a final conclusion. In this case the Administration has not been able to do so.

investigate all of Kansas' allegations. Without the help of the Court, a continued administrative investigation would be futile.

CONCLUSION

Colorado has not only refused to investigate Kansas' allegations of Compact violation pursuant to Article VIII(H) and the Resolution of March 28, 1986, but has also argued that "there is little likelihood of injury to Kansas" by further delay because John Martin Reservoir is full. Colorado, however, has gotten away with the explanation that less is more for many years. John Martin Reservoir has spilled only twice in thirty years. The result of Colorado's postcompact depletions has been to deprive Kansas of the renewable surface resource and force it to tap the nonrenewable ground water resources of the Ogallala aquifer. *Cf., Sporhase v. Nebraska*, 458 U.S. 941, 953 (1982). The injury is both ongoing and obvious.

Colorado has also tried to leave the Court with the impression that it would continue the administrative investigation in good faith. Experience has shown the contrary. When Kansas sought to submit matters relating to the operation of Trinidad Reservoir to arbitration, Colorado refused, stating that it "would prefer that Kansas sue" and that "Colorado was set up to sue and be sued, not arbitrate." *See*, attached Affidavit of Carl Bentrup, Commissioner on the Arkansas River Compact Administration.

Kansas respectfully requests that Colorado be compelled to comply with the Resolution of March 28, 1985, or that the

Court grant the motion for leave to file so that Kansas might pursue its only effective remedy.

Respectfully submitted,

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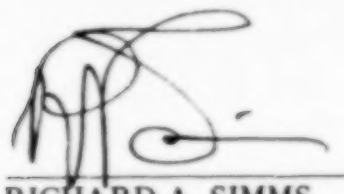

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CERTIFICATE OF SERVICE

Pursuant to Rules 28(5) of the Supreme Court Rules, I certify that three copies of the foregoing Reply Brief and Brief in Support of Motion for Leave to File Complaint or Alternatively to Compel Compliance with Administrative Investigation Pursuant to Article VIII(H) of the Arkansas River Compact were served on March 4th, 1986 on:

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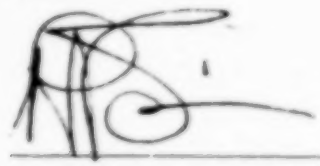

RICHARD A. SIMMS
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AFFIDAVIT

State of Texas)
) ss
County of Taylor)

I, Carl Bentrup, being first duly sworn, upon oath state:

1. That I have been a commissioner on the Arkansas River Compact Administration since June 7, 1957.
2. That on March 25, 1983, I attended a meeting of the Legal and Administration committee of the Arkansas River Compact Administration in Garden City, Kansas. At the December 14, 1982, annual meeting of the Arkansas River Compact Administration, both states had agreed to prepare procedures for arbitration.
3. At the direction of the Kansas Delegation, Mr. John Campbell, Assistant Attorney General for the State of Kansas, had prepared proposed rules of arbitration which he had submitted to the committee for discussion purposes. The State of Colorado had not developed any proposed rules for arbitration for discussion purposes. Mr. McDonald, a Colorado commissioner of the Arkansas River Compact administration, criticized a number of the proposals prepared by Mr. Campbell. Finally, Mr. McDonald left, went to the phone and called the Colorado attorney general. When he returned, he said he had spoken with the attorney general and that Colorado could see no problem that Colorado would be willing to arbitrate. He said Colorado would prefer that Kansas sue them.

Mr. McDonald said that Colorado was set up to sue and be sued, not arbitrate.

Further, affiant sayeth naught.

Dated this 28th day of February, 1986.

/s/ Carl Bentrup
Carl Bentrup, Commissioner
Arkansas River Compact Commission

Subscribed and sworn to before me this 28th day of February, 1986.

/s/ Karen S. Daniels
Notary Public

My Commission Expires 11-20-88 .

Supreme Court, U.S.
FILED
MAR 13 1986
JOSEPH F. SPANIOL, JR.
CLERK

No. 105, Original

IN THE

Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,
Plaintiff,

v.

STATE OF COLORADO,
Defendent.

COLORADO'S BRIEF IN OPPOSITION TO MOTION FOR ALTERNATIVE RELIEF.

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March 12, 1986

No. 105, Original

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INTRODUCTION

On December 16, 1986, Kansas filed a motion for leave to file a complaint against Colorado, together with a complaint alleging material depletion of the waters of the Arkansas River in Colorado in violation of the Arkansas River Compact, primarily by post-compact well development in Colorado. On February 14, 1986, Colorado filed its brief in opposition to the Kansas motion in which Colorado submitted that Kansas had not made a reasonable effort to resolve its concerns through the Arkansas River Compact Administration ("Administration") and that, absent such an effort, this Court should decline to grant the motion. Colorado pointed out that, contrary to the suggestion by Kansas, there is substantial disagreement as to whether post-compact well development in Colorado has materially depleted the flow of the Arkansas River in violation of the Compact. Colorado asserted that the Court should deny the motion for leave to file a complaint because

1. There is a pending investigation by the Administration of post-compact development in Colorado and Kansas;
2. The Administration is not deadlocked or unable to act, but had been proceeding in a cooperative manner to conduct the investigation, notwithstanding differences of opinion as to how the investigation should be conducted;
3. The investigation of well development in Colorado involves complex issues of fact;
4. Passing over the Administration would deny the Court the special expertise of the Administration in addressing the complex hydrologic facts concerning ground water use and would burden the Court with a dispute that might be resolved or narrowed by the Administration; and
5. There is little likelihood of injury while the investigation continues.

On March 3, 1986, Kansas filed a second motion which is captioned: "Motion for Leave to File Complaint or Alternatively to Compel Compliance with Administrative Investigation Pursuant to Article VIII(H) of the Arkansas River Compact." The March 3, 1986 motion makes no reference to the December 16, 1985 motion. Instead, it merely repeats, in somewhat altered form, the allegations in the complaint submitted with the December 16, 1985 motion. The only difference is that, in its second motion, Kansas prays for alternative relief as follows: (1) that the Court compel Colorado to comply with Article VIII.H. of the Compact and the Administration's March 28, 1985 resolution by ordering Colorado to investigate promptly the allegations made by Kansas; (2) that the Court enjoin all post-compact well uses in the Arkansas River Valley pending completion of the Administration's investigation by a date certain; and (3) that the Court retain jurisdiction pending the completion of the investigation by the Administration.

Since Colorado has previously filed a brief in opposition to the Kansas motion for leave to file a complaint, we will confine this brief to the motion for alternative relief.

ARGUMENT

A. Kansas Is Not Entitled To An Order Compelling An Investigation Under The Arkansas River Compact As Requested In Its March 3, 1986 Motion.

1. The Request For An Order Compelling Colorado To Investigate Is Addressed To The Wrong Party And Is Based On A Misunderstanding Of This Court's Role In Resolving Disputes Between Colorado And Kansas Under The Compact.

In its March 3, 1986 motion, Kansas first asks the Court to compel Colorado to comply with Article VIII.H. of the Compact and the Administration's March 28, 1985 resolution by ordering *Colorado* to investigate all of the allegations made by Kansas in the manner dictated by Kansas. Motion at 8. The motion overlooks the fact that the Compact created an Administration comprised of three representatives from each state. Art. VIII.C. An order compelling an investigation under Article VIII.H. would have to be directed to the individual Colorado representatives, who are not named as parties in this action and have not been served. That problem aside, however, there are other reasons why such an order should be denied.

The Arkansas River Compact was approved by Congress in 1949. Act of May 31, 1949, 63 Stat. 145. Major purposes of the Compact were to settle existing disputes, which had been the subject of litigation for nearly fifty years, and to eliminate future controversy. Art. I.

To implement the Compact's purpose of removing causes of future controversy, the Compact directs the Administration to investigate promptly alleged violations of the Compact. Art. VIII.H. The purpose of such investigations is to provide a mechanism for settling controversies by negotiation and agreement, as this Court has urged on many occasions. For example, in *Colorado v. Kansas,* 320 U.S. 383, 392 (1943), the Court stated:

> The reason for judicial caution in adjudicating the relative rights of states in such cases is that, while we have jurisdiction of such disputes, they involve the interests of quasi-sovereigns, present complicated and delicate questions, and, due to the possibility of future change of conditions, necessitate expert administration rather than judicial imposition of a hard and fast rule. ... We say of this case, as the court has said of interstate differences of a like nature, that such mutual accomodation and agreement should, if possible, be the medium of settlement, instead of invocation of our adjudicatory power. (Footnotes omitted.)

Although Colorado and Kansas, in ratifying the Compact, did not intend to bargain away their right to bring an original action in this Court for alleged violations of the Compact,[1] it was hoped that investigations by the Administration would eliminate the need for such actions. However, this Court was never intended to function as an administrative appeals board to review decisions by the Administration. That was precisely the conclusion this Court reached in *Texas v. New Mexico,* 462 U.S. 554 (1983). In that case, the Court carefully examined the Pecos River Compact to determine the role that compact left to the Court in resolving disputes between the two compacting

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[1]This is clear from the structure of the Compact and the record of the Colorado-Kansas Arkansas River Compact Commission. The Compact provides: "Findings of fact made by the Administration shall not be conclusive in any court or before any agency or tribunal but shall constitute prima facie evidence of the facts found." Art. VIII.I. Although the Compact provides for the possibility of referring disputed matters to arbitration, there was considerable discussion during the negotiations of the Compact that both states would ultimately retain the right to bring an original action in this Court for alleged violations of the Compact if they disagreed with the Administration's findings. *E.g.,* Record of the Twelfth Meeting of the Colorado-Kansas Arkansas River Compact Commission, 12-52 to 12-53 (Feb. 3, 4, 5 and 6, 1948); Record of the Fifteenth Meeting, 15-48 to 15-50 (Sept. 13, 14, 15, and 16, 1948).

states. New Mexico argued that this Court could do nothing more than review official actions of the Pecos River Compact Commission and that the case should be dismissed if the Court found that there were no action of the commission to review or that actions taken were not arbitrary or capricious. *Id.* at 566-67.

In rejecting New Mexico's argument, this Court first noted that the mere existence of a compact does not foreclose the possibility that the Court will be required to resolve a dispute between the compacting states. 462 U.S. at 568. Further, the Court held that, in the absence of an explicit provision or other clear indication, it would not construe a compact to preclude a state from seeking judicial relief when the compact does not provide an equivalent method of vindicating a state's right. *Id.* at 569-70. The Court then emphatically rejected New Mexico's theory that the role of this Court was to review decisions of the commission:

> In recent years, we have consistently interpreted 28 U.S.C. §1251(a) as providing us with substantial discretion to make case-by-case judgments as to the practical necessity of an original forum in this Court for particular disputes within our constitutional original jurisdiction. (Citations omitted.) We exercise that discretion with an eye to promoting the most effective functioning of this Court within the overall federal system. (Citation omitted.) *If authorized representatives of the compacting states have reached an agreement within the scope of their congressionally ratified powers, recourse to this Court when one state has second thoughts is hardly "necessary for the state's protection." Massachusetts v. Missouri,* 308 U.S. 1, 18 (1939).[18] Absent extra-ordinary cause, we shall not review the Pecos River Commission's actions without a more precise mandate from Congress than either the compact or 28 U.S.C. §1251 provides. (Emphasis added.)

462 U.S. at 570-71. In footnote 18 of the opinion, the Court stated:

> When it is able to act, the Commission is a completely adequate means for vindicating either State's interests. The need for burdensome original jurisdiction litigation, which prevents this Court from attending to its appellate docket, would seem slight.

Id. at 571 n. 18.

The request by Kansas for an order compelling Colorado to investigate allegations made by Kansas under the provisions of Article VIII.H. of the Arkansas River Compact is based on a fundamental misunderstanding of the role of this Court under the Compact. In Colorado's view, the relevant issue is whether the Administration is able to act. If the Administration has agreed to proceed with an investigation, notwithstanding disagreements between the members as to how the investigation should be conducted, the Court should decline to grant the Kansas motion for leave to file a complaint or the alternative relief requested by Kansas. Merely because the Kansas Attorney General apparently had misgivings because the authorized representatives of the states agreed to continue with the investigation on the basis of a cooperative approach is not sufficient, in Colorado's judgment, to justify an original forum in this Court or any other form of relief.

According to Kansas, however, an order compelling Colorado to investigate the Kansas allegations is necessary because "Colorado refused to proceed to investigate depletions by wells and five other areas in the Resolution of October 8, 1985." Kansas Reply Brief/Brief in Support at 15. This is simply not correct. Kansas mischaracterizes the report by the director of the Colorado Water Conservation Board and the Administration's October 8, 1985 resolution. *See* Colorado's Brief in Opposition to Motion for Leave to File Complaint at 11-14. According to Kansas, "[t]hat resolution was *not* a bilateral

affirmation that the investigation should proceed, but rather a unilateral rejection of the investigation in essentially all of the areas deemed crucial by the State of Kansas." Kansas Reply Brief/Brief in Support at 15. We have read the October 8, 1985 resolution many times, but have not yet been able to read the resolution as Kansas does. In fact, the authorized representatives of the compacting states, acting within the scope of their congressionally ratified powers, reached agreement on how to proceed with an investigation of alleged violations of the Compact, notwithstanding differences of opinion as to how the investigation should be conducted. Subsequently, the Kansas Attorney General, for whatever reasons, had "second thoughts" about the cooperative approach to the investigation which the Administration adopted at its meeting on October 8, 1985, and has tried hard to characterize that resolution as something other than a directive to the committee to continue with its investigation. While Colorado believes the Court should be sensitive to charges that one state or the other is using an investigation for the purposes of delay, Colorado does not see how the facts in this case are susceptible to that interpretation.[2]

2. There Is No Basis For An Order Compelling An Investigation Because The Colorado Representatives Have Not Thwarted A Meaningful Investigation By The Administration.

As grounds for its motion to compel, Kansas maintains that the Colorado representatives have thwarted "any meaningful investigation by the Arkansas River [Compact] Administra-

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[2]As the United States Representative to the Administration pointed out in his remarks, the Administration has been successful both in the past and during the current investigation in establishing factual matters. *See* Remarks of the U.S. Representative to the Arkansas River Compact Administration at the annual meeting of the Administration held in Pueblo, Colorado (Dec. 10, 1985) (printed in Appendix A to Colorado's Brief in Opposition to Motion for Leave to File Complaint), Appendix A at 3a.

tion" of (1) post-compact well development in Colorado; (2) the operation of the Trinidad Reservoir; (3) Colorado's failure to abide by a July 24, 1951 resolution of the Administration; and (4) future plans to consume "transmountain" return flows. Each issue requires a separate response. Kansas Reply Brief/ Brief in Support at 8-9, 15.

a) Post-Compact Well Development In Colorado.

With regard to post-compact well development in Colorado, the Administration agreed in its October 8, 1985 resolution to continue with the investigation in the manner recommended by the director of the Colorado Water Conservation Board, which was to determine (1) whether there had been any unexplained declines in streamflow or changes in the relationship between streamflows at key locations in the Arkansas River Basin; and (2) if so, to investigate first the most likely causes for such declines or changes based on the timing and reach of the river in which such declines or changes had occurred.

Kansas asserts that Colorado is thereby simply "attempt[ing] to bury a problem that has plagued the state for decades." *Id.* Kansas alleges that Colorado "[f]or decades allowed the proliferation of unregulated wells in the Arkansas Valley, ignoring the inevitable effects on surface users." *Id.* at 4. And "Colorado refused to address the problem, fearing that agricultural interests would be hurt by any curtailment or regulation of wells." *Id.*

Colorado does not deny that it has struggled long and hard to achieve integrated administration of surface and ground water in the Arkansas River Valley and throughout the State of Colorado. *See, e.g., Fellhauer v. People,* 167 Colo. 320, 447 P.2d 986 (1968); *Kuiper v. Well Owners Conservation Ass'n.,* 176 Colo. 119, 490 P.2d 268 (1971) (upholding State Engineer's

rules and regulations on ground water use in the South Platte River Valley); *Kuiper v. Atchison, Topeka & Santa Fe Ry.,* 195 Colo. 557, 581 P.2d 283 (1978) (upholding water judge's decision to disapprove proposed amendment to rules and regulations on ground water use in the Arkansas River Valley and continuing in force existing rules and regulations); *Alamosa-La Jara Water Users Protection Ass'n. v. Gould,* 674 P.2d 914 (Colo. 1983) (remanding proposed rules and regulations for ground water use in the San Luis Valley for consideration by the State Engineer of additional factors, including environmental and economic concerns). What Colorado objects to in the Kansas statement of facts concerning ground water regulation in Colorado is the failure to acknowledge that Colorado was years ahead of Kansas in regulating well development.

Unregulated well development in Kansas continued until 1977 when the Kansas Chief Engineer declared a moratorium along the Arkansas River Valley in Hamilton and Kearny Counties, the two counties in southwestern Kansas closest to the Colorado-Kansas stateline.[3] By 1980, according to the U.S. Geological Survey, approximately 351,000 acres of land were irrigated by ground water or by surface water from the Arkansas River in Kansas from approximately 3,060 wells.[4] This compares to 56,000 acres that were under irrigation in Kansas in 1939. *Colorado v. Kansas*, 320 U.S. 383, 399 (1943). By contrast, the Colorado Water Judge found that wells in Colorado were used as a supplemental source of supply to irrigate existing

[3] R. Barker, L. Dunlap, & C. Sauer, Analysis and Computer Simulation of Stream-Aquifer Hydrology, Arkansas River Valley, Southwestern Kansas, U.S.G.S. Water-Supply Paper 2200 at 1, 3 (1983).

[4] *Id.* at 8, 15 (160 wells; 31,000 acres irrigated in Phase I study area); L. Dunlap, R. Lindgren & C. Sauer, Geohydrology and Model Analysis of Stream-Aquifer System Along the Arkansas River in Kearny and Finney Counties, Southwestern Kansas, U.S.G.S. Water-Supply Paper 2253 at 11 (1985) (2,900 wells; 320,000 acres irrigated in Phase II study area).

lands.[5] In neither of its motions, nor its briefs, nor its complaint, does Kansas even acknowledge the findings by the Colorado Water Judge in December 1976 that there was no competent evidence that stream flows had in fact suffered during the post-well period in Colorado or that reductions, if any, could be traced to well diversions rather than other causes.[6]

Unwittingly, Kansas supports the Colorado Water Judge's findings. In paragraph 7 of its motion, Kansas alleges that depletions have been caused by, among other things, the proliferation of unregulated alluvial wells along the Arkansas River, "essentially all of which are located above John Martin Dam and Reservoir." Motion at 2-3, ¶ 7. However, the mass diagram analysis by the Administration's investigation committee showed that the change in relationship between flows in various reaches of the Arkansas River in Colorado had occurred *below* John Martin Reservoir, which reinforces the findings by the Colorado Water Judge and supports the conclusion of the director of the Colorado Water Conservation Board that well development in Colorado does not appear to have been a likely cause of the decline in usable stateline flows beginning in 1974. *See* Colorado's Brief in Opposition to Motion for Leave to File Complaint at 12-13. Thus, the Colorado representatives have not thwarted a meaningful investigation of post-compact well development in Colorado by the Administration. Instead, Kansas only wants to recognize evidence that supports its own preconceived conclusion.[7]

[5]In re the Amendment of the Rules and Regulations Governing the Use, Control and Protection of Surface and Ground Water Rights Located in the Arkansas River and Its Tributaries, Case Nos. W-4079, W-4080, W-4083, W-4084, and W-4085 at 10 (Dist. Ct., Water Division No. 2, Dec. 1, 1976), *aff'd sub. nom.* Kuiper v. Atchison, Topeka & Santa Fe Ry., 195 Colo. 557, 581 P.2d 293 (1978).

[6]*Id.* at 16.

b) Trinidad Reservoir.

With regard to the Trinidad Reservoir, the Colorado representatives have never refused to investigate the operation of that reservoir.

In its brief, Kansas states that the operation of Trinidad Reservoir "was initially investigated in 1981, and the ***Administration's recommendation*** that the Colorado State Engineer immediately release 18,290 acre-feet of water unlawfully stored was defeated by Colorado's negative vote on the Resolution of January 4, 1982." Kansas Reply Brief/Brief in Support at 15 (emphasis added). This is another example of the way in which Kansas has mischaracterized actions by the Administration.

First of all, the Colorado representatives agreed to an investigation of storage in Trinidad Reservoir under Article VIII.H. of the Compact at a special meeting of the Administration on June 30, 1980. Annual Report, Arkansas River Compact Administration, 47 (1980). At a special meeting on September 25, 1980, the Administration approved findings of fact concerning storage and transfer of water in Trinidad Reservoir during 1979 and 1980 based on the results of the investigation. *Id.* at 12-15. However, the Colorado representatives did not agree

[7]The assertion by Kansas that "well depletion has been discussed, both formally and informally, at numerous meetings of the Compact Administration," Kansas Reply Brief/Brief in Support at 10, is greatly exaggerated. No doubt there was discussion of the Colorado State Engineer's efforts to regulate well development in Colorado, but it was not until Attorney General Stephan's letter of February 26, 1985, that well development in Colorado was raised for the first time by Kansas. All prior correspondence and discussion with Attorney General Stephan or with the Kansas representatives had related to the operation of Trinidad Reservoir or Pueblo Reservoir.

that those facts established a violation of the Compact. *Id.* at 48. The Administration then recommended that the Kansas Chief Engineer confer with the Colorado State Engineer "to make further inquiries into this question as expeditiously as possible." *Id.* at 48. The two engineers met in Topeka, Kansas, on July 1, 1981. Annual Report, Arkansas River Compact Administration, 55 (1981). The Colorado State Engineer then furnished to the Kansas Chief Engineer information concerning storage records requested by the Kansas Chief Engineer on the understanding that if such information was supplied, the issue concerning the operation of Trinidad Reservoir would be dropped. *Id.* at 55-56. At a special meeting of the Administration on August 6, 1981, however, the Kansas Chief Engineer indicated that the issue was not resolved. Colorado believes it is important to set the record straight on this matter. Unfortunately, the only way to do so is to quote the entire discussion from the minutes of the Administration meeting:

> Mr. Gibson [the Kansas Chief Engineer] noted that he had, during the meeting [with the Colorado State Engineer], questioned: (1) whether or not the transfer among accounts in Trinidad Reservoir had affected the river in the same manner had Trinidad Reservoir not been there, and (2) the right to make such "paper" transfers. Mr. Gibson noted that Dr. Danielson [the Colorado State Engineer] had provided information to him on the 10 year running average at the Thatcher gage, which average had been exceeded by actual flows for the entire period of available record. Mr. Gibson stated, however, that the available record covered only 10 or 11 years.
>
> Mr. Gibson went on to note that he had requested additional information at the meeting, which information was subsequently provided by Dr. Danielson. Mr. Gibson then called upon his deputy, Mr. Jerry Hilmes, to report on his review of the data provided to Mr. Gibson by Dr. Danielson in a letter dated July 29, 1981

> (see Attachment B). Mr. Hilmes then reiterated the information contained in Dr. Danielson's letter of July 29.
>
> Mr. Bentrup [a Kansas representative] asked if the Colorado State Engineer had also provided a report. Mr. McDonald [the director of the Colorado Water Conservation Board] responded that Dr. Danielson's letter of July 29 constituted his report on this matter. Mr. Bentrup indicated that the Kansas ditches were anxious to have the Administration's deliberations concluded if no further steps under Article VIII, paragraph H of the compact were to be taken. Mr. Cooley [the U.S. representative] then reviewed the chronology of the Administration's actions and the exchange of information between Colorado and Kansas. He commented that it appeared to him that Dr. Danielson's July 29 letter disposed of the questions thus far raised by Kansas. Mr. Gibson responded that he did not believe that all relevant information had yet been addressed, citing examples of what he had in mind.
>
> Discussion ensued about the Administration's process concerning the Trinidad Reservoir matter. Mr. Bentrup reiterated his concern that the Administration not prolong the process or delay its dispositon of this matter. He noted that he had expected Dr. Danielson to report to the Administration at this meeting.
>
> Mr. McDonald reiterated his earlier observation that the July 29 letter from Dr. Danielson constituted his report. He further stated that Colorado had responded to every request for information made to date by Kansas. He also noted that the Administration, by resolution, had asked only that the Kansas chief engineer confer with the Colorado state engineer. The Administration had not formed a committee nor asked the state engineers to prepare a report. Mr. McDonald com-

mented that he considered the initiative to be with Kansas to decide whether they were or were not satisfied with the information thus far provided to them.

At this time the Kansas delegation asked for a brief recess, which was granted by the chairman. Upon returning from the recess, the Kansas delegation indicated that they had in preparation a motion concerning the Trinidad Reservoir matter which was not then ready. They asked to go on to the next item on the agenda.

* * *

Upon reconvening, Mr. Bentrup indicated that the Kansas delegation no longer wished to offer the proposed motion on Trinidad Reservoir which was discussed prior to lunch. Rather, Mr. Bentrup indicated that Kansas would be asking the Colorado State Engineer for additional information and data concerning the operation of Trinidad Reservoir within the next couple of weeks. It was agreed that this matter would be placed on the agenda for the December, 1981, annual meeting.

Id. at 49-50, 52.

At the next meeting of the Administration on January 4, 1982, without further investigation or discussion, Mr. Bentrup, one of the Kansas representatives, proposed a resolution that the State Engineer of Colorado immediately release all water in excess of the 6,200 acre-feet stored in Trinidad Reservoir. Annual Report, Arkansas River Compact Administration 38, 57 (1982). After the motion was seconded by another Kansas representative, the minutes of the meeting state as follows:

> Mr. McDonald [the director of the Colorado Water Conservation Board] noted that he respectfully disagreed with the resolution, that the Colorado State Engineer has and would continue to administer Trinidad Reservoir in conformance with the compact, and that Colorado had to reject the motion. The motion failed with Kansas voting yes and Colorado voting no.

Id. at 38. Thus, contrary to the statement by Kansas, there was no Administration "recommendation" that the Colorado State Engineer immediately release 18,290 acre-feet of water "unlawfully" stored in Trinidad Reservoir, but merely a resolution proposed by a Kansas representative which was voted against by the Colorado representatives. Thereafter, the Colorado Attorney General refused to join in a request by the Kansas Attorney General to arbitrate the dispute concerning Trinidad Reservoir unless and until Kansas first produced further factual information to support its contention that Trinidad Reservoir had been operated in violation of the Compact. Annual Report, Arkansas River Compact Administration, 88-89 (1983) (letter dated March 23, 1983, from Colorado Attorney General Duane Woodard to Attorney General Robert T. Stephan).

Thereafter, the Kansas Attorney General petitioned the Kansas legislature for funds and on September 23, 1983, contracted with a consulting engineering firm to analyze the operation of the Trinidad Project and other matters of concern to Kansas. Kansas Reply Brief/Brief in Support at 12. This report was completed in 1984 and a copy was transmitted to the Colorado Attorney General. However, the Kansas Attorney General's office informed Colorado that Kansas was in the process of compiling and documenting its concerns and would present a written document to Colorado officials outlining its concerns prior to the March 28, 1985 meeting of the Administration. Letter dated December 13, 1984, from John W. Campbell, Assistant Attorney General, to William H. Bassett, Assistant Attorney General. On March 28, 1985, the Kansas representatives requested the Administration to investigate the operation of the Trinidad Dam and Reservoir Project and the Colorado representatives agreed to the investigation.

The Kansas allegations concerning Trinidad Reservoir have not been the focus of the committee investigation for a simple reason. The Administration, at its annual meeting on December 11, 1984, requested the U.S. Bureau of Reclamation to initiate a review of the operating principles for the project in accordance with a condition to the operating principles which was proposed by the State of Kansas and approved by the U.S. Bureau of Reclamation and the Purgatoire River Water Conservancy District.[8] Minutes of Arkansas River Compact Administration Meeting held at Lamar, Colorado, at 10 (Dec. 11, 1984). As Kansas acknowledges in its reply brief, the U.S. Bureau of Reclamation issued a draft review of the operating principles on December 20, 1985, and requested comments on the draft review by February 15, 1986. That date was subsequently extended to March 3, 1986, at the request of the Kansas Chief Engineer. While Kansas is correct that the Bureau of Reclamation has no power to force the Colorado representatives to vote affirmatively, the essential point is that the review by the Bureau of Reclamation provides an adequate means to address its concerns about the operation of the project. *See United States v. Nevada,* 412 U.S. 534, 538 (1973); *Illinois v. Milwaukee,* 406 U.S. 91, 93-94 (1972).

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[8]The Trinidad Dam and Reservoir was authorized by Congress in the Flood Control Act of 1958. Act of July 3, 1958, 72 Stat. 305, 309, *as amended by* Act of October 27, 1965, 79 Stat. 1073, 1079. On February 10, 1967, the United States entered into a contract with the Purgatoire River Water Conservancy District ("PRWCD") which provided for construction, repayment, and operation of the project in accordance with, among other things, operating principles and the laws of the State of Colorado. Prior to signing the contract, the PRWCD adopted a resolution approving five conditions to the operating principles proposed by the State of Kansas, one of which provided for a review of the operating principles five years after beginning operation of the reservoir for irrigation "to determine the effect, if any, the operation has had on other Colorado and Kansas water users and the principles amended as necessary."

c) Pueblo Reservoir.

With regard to the Pueblo Reservoir, the Colorado representatives have never refused to investigate the operation of the reservoir. However, the only question that Kansas suggests should be investigated is whether Colorado complied with a July 24, 1951 resolution of the Administration expressing as a policy of the Administration that there be no reregulation of native waters of the Arkansas River, as proposed in a report on the Gunnison-Arkansas Project, until a plan of operation had been submitted to and approved by the Administration. As explained in Colorado's Brief in Opposition to Motion for Leave to File Complaint, the Colorado representatives have not agreed that the resolution is applicable to the Fryingpan-Arkansas Project, of which Pueblo Reservoir is a component; but, in any event, Kansas does not deny that the Administration failed to raise an objection to the winter storage program in Pueblo Reservoir for six years after it began operation in 1975, or that the winter storage program was operated since 1975 with the full knowledge of the Administration, or that the U.S. Geological Survey performed a review of the potential reduction of inflow to John Martin Reservoir from winter storage in Pueblo Reservoir in 1975 and again in 1981 and presented its findings to the Administration at a special meeting on August 6, 1981. Under the circumstances, Colorado fails to see how the Kansas complaint raises a substantial question justifying an original action in this Court or any other relief.

d) Transmountain Return Flows.

With regard to "transmountain"[9] return flows, Kansas asserts that they need to be investigated for two reasons. First, Kansas asserts that "transmountain" water imported into the Arkansas River Basin has been deducted from the upstream

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[9]The term "transmountain" water in this instance refers to water imported into the Arkansas River Basin from the Colorado River Basin.

gages, while the return flows have not. Kansas Reply Brief/ Brief in Support at 16. This is correct, but this has always been the case. Water imported into the Arkansas River Basin is not apportioned to Kansas under the Arkansas River Compact. *See* Art. III.B., IV.A. To the extent "transmountain" water can be distinguished from "native" waters of the Arkansas River, it is deducted from the flow at upstream gages. Once "transmountain" water is applied to use for irrigation, it is not possible in most cases to distinguish "transmountain" return flows from "native" waters of the Arkansas River. "Transmountain" return flows, whatever the amount, that reach and are stored in John Martin Reservoir are not separately accounted for. Indeed, Colorado believes that it would be difficult, if not impossible, to do so because of the number of intervening ditches which divert water above John Martin Reservoir in Colorado. To the extent "transmountain" return flows reach, and are stored in John Martin Reservoir, Kansas receives the benefit of the additional supply, if any. Kansas has no right to "transmountain" water under the Compact and has no right to complain about proposals by the City of Colorado Springs to reuse or successively use "transmountain" water, which it has the right to do under Colorado law. Colo.Rev. Stat. §37-82-106 (1985 Cum. Supp.). Any possible injury to Kansas from the reuse of "transmountain" water is purely hypothetical at this point.

B. None Of The Factors Necessary For A Preliminary Injunction Against Post-Compact Well Uses Are Present In This Case.

In addition to its request for an order compelling Colorado to investigate, Kansas asks the Court for an order to enjoin all post-compact well uses in the Arkansas River Valley pending completion of the Administration's investigation within a time

certain. Motion at 8.[10] There is simply no basis for such extraordinary relief. An application for a preliminary injunction is addressed to the sound discretion of the Court. "Factors traditionally examined include: (1) the threat of immediate irreparable harm; (2) the likelihood of success on the merits; (3) whether the public interest would be better served by issuing than by denying the injunction; and (4) the comparable hardship inflicted upon the parties." *Massachusetts Coalition of Citizens with Disabilities v. Civil Defense Agency*, 649 F.2d 71, 74 (1st Cir. 1981); 11 C.Wright & A.Miller, Federal Practice and Procedure §2948 at 430-31 (1973).

An examination of these factors does not support the request for a preliminary injunction. First, there is no threat of immediate irreparable harm because John Martin Reservoir is nearly full at the present time and, in any event, Kansas water users have an alternate source of supply available from wells. *See* Kansas Reply Brief/Brief in Support at 19.[11] Second, the findings by the Colorado Water Court and the results of the investigation by the committee to date demonstrate there is no substantial likelihood of success on the claim that well development in Colorado has materially depleted the flows of the Arkansas River in violation of the Compact; the Kansas allegation raises complex issues of fact whose resolution is not free from doubt. This is compounded by the lack of any immediate irreparable harm. Third, the public interest would not be served by enjoining post-compact well uses in Colorado when it is apparent that well development in Kansas occurred to a far greater extent and continued long after such development was curtailed in Colo-

[10]Presumably, Kansas only intended to ask for an order to enjoin post-compact well uses in Colorado, but its motion is not so limited.

[11]The statement that these wells "tap the nonrenewable ground water resources of the Ogallala aquifer," Kansas Reply Brief/Brief in Support at 19, is not supported by the U.S.G.S. study. *See* L. Dunlap, R. Lindgren & C. Sauer, *supra* note 4, U.S.G.S. Water-Supply Paper 2253.

rado, and particularly when Colorado water officials have made substantial efforts to regulate post-compact well development since 1965. Fourth, the hardship inflicted on Colorado well owners would be far greater than any potential benefit to Kansas in view of the fact that John Martin Reservoir is nearly full and the Kansas water users have an alternate source of supply available from wells.[12] Thus, there is no basis for a preliminary injunction.

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[12]Furthermore, some post-compact wells in Colorado are operated as alternate points of diversion for pre-compact surface water rights or are operated pursuant to court decreed plans for augmentation pursuant to which depletions are replaced from other sources. *See, e.g.,* Kelly Ranch v. Southeastern Colorado Water Conservancy Dist., 191 Colo. 65, 550 P.2d 297 (1976). And all post-compact wells are subject to the State Engineer's rules and regulations governing ground water use which have been in effect since 1972.

CONCLUSION

While it is apparent that there are matters in dispute between Kansas and Colorado,[13] these disputes involve matters which require a high degree of expert and technical knowledge and which may be resolved or narrowed by the Administration or do not otherwise justify the exercise of original jurisdiction or the extraordinary relief sought by Kansas. The following facts, however, are not in dispute:

1. On March 28, 1985, the Administration, at the request of Kansas and Colorado, adopted a resolution to investigate a number of allegations of violations of the Compact, including well development in both states.

2. The resolution established a committee consisting of the director of the Colorado Water Conservation Board or his designee and the Chief Engineer of Kansas or his designee to conduct the investigation.

3. Beginning in April, 1985, the committee devoted substantial efforts to establishing a data base and preparing a mass diagram analysis to determine if there had been any changes in the relationship between streamflows at selected locations in the Arkansas River Basin.

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[13]This is only emphasized by the accusation in the Kansas brief that Colorado "has not recited the essential facts, has dissembled those it did recite, and would mislead the Court into a decision to decline jurisdiction." Reply Brief/Brief in Support at 2. The essential point, which Kansas misses, is that the findings by the Colorado Water Court demonstrate that there is a substantial, good-faith dispute as to whether well development in Colorado has materially depleted the flows of the Arkansas River in violation of the Compact. *See* Colorado's Brief in Opposition to Motion for Leave to File Compact at 15-17.

4. On July 12, 1985, at the request of the Kansas representatives, the Administration agreed to amend the March 28, 1985 resolution to include an investigation of whether Colorado had complied with the provisions of Article V.F. of the Compact concerning the administration of decreed rights in Colorado on the basis of relative priorites.

5. On October 8, 1985, after extensive reports were submitted by both committee members on the status of the investigation and areas for further investigation, the Administration expressly authorized the committee to "continue with its investigation on the matters upon which the Committee has mutually agreed that further investigation should be undertaken."

6. John Martin Reservoir is nearly full at the present time and there is little likelihood of injury to Kansas if the Administration proceeds with its investigation.

Based on the foregoing facts which are not in dispute, the Kansas motion for leave to file a complaint or, in the alternative, to compel compliance with Article VIII.H. of the Arkansas River Compact should be denied.

Respectfully submitted,

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Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,
Plaintiff,

v.

STATE OF COLORADO,
Defendant.

REPLY TO COLORADO'S BRIEF IN OPPOSITION TO MOTION FOR ALTERNATIVE RELIEF

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No. 105, Original

IN THE

Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,
Plaintiff,

v.

STATE OF COLORADO,
Defendant.

REPLY TO COLORADO'S BRIEF IN OPPOSITION TO MOTION FOR ALTERNATIVE RELIEF

INTRODUCTION

In our reply to Colorado's Brief in Opposition to Motion for Leave to File Complaint we stated that "Colorado . . . has not related the essential facts, has dissembled those it did recite, and would mislead the Court into a decision to decline jurisdiction." *Id.*, at 2. In its Brief in Opposition to Motion for Alternative Relief, Colorado accuses Kansas of "mischaracterizing" Colorado's refusal to investigate Kansas' allegations of

compact violation pursuant to Article VIII(H). Accordingly, it should be clear to the Court that either Kansas or Colorado is not telling it straight.

The object of this reply is to let the facts tell the Court whether Colorado is complying with Article VIII(H) of the Compact or whether Colorado has purposely rendered the administrative investigation futile and useless.

ARGUMENT

POINT I

COLORADO'S REFUSAL TO CONDUCT AN ADMINISTRATIVE INVESTIGATION MAKES LITIGATION KANSAS' ONLY EFFECTIVE REMEDY; ALTERNATIVELY, THE COURT SHOULD COMPEL COLORADO TO COMPLY WITH ARTICLE VIII(H) OF THE ARKANSAS RIVER COMPACT.

A. The Resolution of October 8, 1985 Was *Not* a Bilateral Affirmation that the Investigation Should Proceed, but Rather a Unilateral Rejection of the Investigation in Regard to Each of Kansas' Allegations of Compact Violation.

Colorado puts the fundamental issue this way: "The Administration is not deadlocked or unable to act, but had been proceeding in a cooperative manner to conduct the investigation, notwithstanding differences of opinion as to how the investigation should be conducted . . .." Brief in Opposition to Motion for Alternative Relief, at 1. Without reference to the administrative record or any facts, Colorado explains that in the Resolution of October 8, 1985, "the authorized representatives of the states agreed to continue on the basis of a cooperative approach . . .." *Id.*, at 6.

The essential facts are as follows:

1. In the Compact Administration's Resolution of March 28, 1985, Colorado agreed to investigate all of Kansas' allegations of compact violation. *See,* Exhibit L, Transcript of Special Meeting of the Arkansas River Compact Administration, March 28, 1985.

2. At the meeting of the Administration's Investigation Committee on May 7, 1985, Kansas proposed a scope of work directing the investigation of specific allegations of alleged depletions. Colorado disagreed with this approach and proposed to rewrite the scope of work for consideration in June. Minutes of the Investigation Committee, Arkansas River Compact Administration, May 7, 1985.

3. On June 3, 1985, the Investigation Committee adopted a procedure to compile streamflow data and to construct a series of single and double mass diagrams of the flows of the Arkansas River and the Purgatorie River, the purpose of the mass analyses being to determine whether there had been declines in stateline flows or inflows into John Martin Reservoir. It was agreed that if the diagrams indicated that declines had in fact occurred, further studies would be undertaken to ascertain the causes. Kansas stated that transmountain return flows would have to be accounted for, and Colorado stated that it would not investigate or attempt to quantify transmountain returns. Minutes of the Investigation Committee, Arkansas River Compact Administration, June 3, 1985.

4. On July 10, 1985, Colorado again refused to quantify transmountain return flows.

5. On July 12, 1985, each state submitted its own set of mass analyses. Kansas stated its interpretation that the mass diagrams indicated postcompact depletions to usable stateline flows of 40,000 acre feet annually without adjustment for the masking of additional depletions caused by transmountain

return flows. Colorado acknowledged that stateline flows had declined from 1974-1978, but asserted that the streamflows since 1979 were nearly back to normal.

6. Separate reports, reaching different conclusions, were submitted by Kansas and Colorado in early September, 1985. *See,* "Report to the Arkansas River Compact Administration Regarding the Article VIII(H) Investigation of Alleged Violations of the Arkansas River Compact," David L. Pope, State of Kansas, September 4, 1985; "Report to Investigation Committee of the Arkansas River Compact Administration," J. William McDonald, State of Colorado, September 6, 1985. The states could not agree on a single report to the Administration and agreed to prepare supplemental reports interpreting the mass analyses and recommending further studies for the committee, if any. *See,* "Supplemental Report to the Arkansas River Compact Administration Regarding the Article VIII(H) Investigation of Alleged Violations of the Arkansas River Compact," David L. Pope, State of Kansas, October 4, 1985; "Memorandum to the Arkansas River Compact Administration," J. William McDonald, State of Colorado, October 4, 1985. *In both reports each state recognized that mass diagram analyses provide no basis on which to identify or isolate causes of indicated depletions.*

7. On October 8, 1985, it was again concluded that the states would have to submit separate reports to the Administration because they could not agree on the conclusions to be drawn from their work or on how to proceed. Colorado recommended further investigation of four possible causes of depletions. Kansas recommended further investigation of ten potential causes of the indicated depletions, including the four Colorado recommended and, most importantly, the development of alluvial wells, the operation of upstream reservoirs, and transmountain return flows. *See,* Resolution of the Arkansas River Compact Administration Regarding Continued

Violations of Alleged Compact Violations Set Forth in the Resolution of March 28, 1985, As Amended on July 12, 1985. In the Resolution, Kansas agreed to investigate everything Colorado proposed to investigate, and Colorado refused to investigate all of Kansas' allegations of compact violation. Transcript of Meeting of Arkansas River Compact Administration, October 8, 1985.

8. At the meeting of the Compact Administration on December 10, 1985, Colorado again rejected Kansas' request to investigate its allegations of depletion of the stateline flows of the Arkansas River. Additionally, Colorado refused to enjoin its postcompact ground water appropriations which result in surface depletions, despite the fact that those appropriations materially deplete the usable and available flows of the Arkansas River.

9. In its Report to the Arkansas River Compact Administration Regarding the Article VIII(H) Investigation of Alleged Violations of the Arkansas River Compact of December 6, 1985, Papadopulos & Associates expressed the opinion that postcompact well development in Colorado has materially and substantially depleted the Arkansas River and that Colorado's purposeful attempt to avoid study of well depletions is not remotely justifiable on the basis of any hydrologic or engineering reason.

10. Based on Colorado's refusal to abide by the mandate of Article VIII(H) and its initial agreement to investigate Kansas' allegations of depletion in the Resolution of March 28, 1985, and having no effective alternative but to invoke the original jurisdiction of this Court, Kansas filed this suit on December 16, 1985.

B. The Request for an Order Compelling Colorado to Comply with Article VIII(H) Need Not Be Directed to Invidual Officers of the State of Colorado.

Colorado's argument that its representatives cannot be compelled to do anything because they are not named individually is incorrect. This Court has ordered a state's agents to comply with its rulings although the state's agents were not named. *See, e.g., Nebraska v. Wyoming,* 325 U.S. 589, 665 (1945); *Arizona v. California,* 376 U.S. 340 (1963). A state acts only through its officers and agents. *Cooper v. Aaron,* 358 U.S. 1 (1958). Accordingly, any order directed to Colorado would necessarily apply to its representatives. *See, Regal Knitwear Co. v. N.L.R.B.,* 324 U.S. 9 (1945).

C. The Court Has Authority to Compel Compliance with the Provisions of the Arkansas River Compact.

Decisions of the Court confirm its ability in original actions to tailor procedure to the needs of a specific case. Although the Court uses the rules of civil procedure as a guide in original actions, it is not "invariably governed by common-law precedent or by current rules of civil procedure." *Ohio v. Kentucky,* 410 U.S. 641 (1973). Accordingly, the Court has formulated many different methods to deal with cases in its original jurisdiction. *See,* R. Stern and E. Gressman, *Supreme Court Practice,* Section 10.12 (5th ed. 1978).

The Court has authority to compel Colorado's compliance with the compact provisions. A compact is federal law. *See, Texas v. New Mexico,* 462 U.S. 554 (1983). The Court has previously compelled compliance with federal laws, including the enforcement of federal constitutional rights, statutory rights and the mandates of the Court's decisions. *See, e.g., Cooper v. Aaron,* 358 U.S. 1 (1958); *Louisiana v. United States,* 380 U.S. 145 (1965); *Vendro Co. v. Lektro-Vend Corp.,* 434 U.S. 425 (1978). Likewise, the Court has required states to abide by their obligations under a compact and refused to allow them to unilaterally define the scope of their compact obligations. *See, Virginia v. West Virginia,* 246 U.S. 565 (1918); *West Virginia ex rel. Dyer v. Sims,* 341 U.S. 22 (1951); *Petty v. Tennessee – Missouri Bridge Comm.,* 359 U.S. 275 (1959) (compact obligations enforced under federal law). At the minimum, Kansas is entitled to a meaningful remedy which requires Colorado to comply with its investigatory obligations under the Compact.

1. Postcompact Well Development.

Colorado argues that the states agreed to utilize single and double mass analyses to determine whether there had been any declines in stateline flows and then "to investigate first the most likely causes for such declines . . .." Brief in Opposition to Motion for Alternative Relief, at 8. Not only was there no such agreement, it was agreed by both states that the mass analyses provided no basis whatsoever for identifying causes of indicated declines. *See, supra,* at 5. Ignoring the mandate of Article VIII(H), Colorado has arbitrarily selected four possible causes of the declines and refused to consider six other decidedly more probable causes. *Cf.,* Resolution of October 8, 1985.

Colorado also attempts to cover up its dereliction in ground water regulation by hyperbolizing about "the special expertise of the Administration in addressing the complex hydrologic facts concerning ground water use . . .." Brief in Opposition to Motion for Alternative Relief, at 1. The fact is that Colorado refuses to investigate depletions of surface flows caused by ground water diversions. It also takes no special expertise to know that water sucked through a straw empties a glass just as quickly as sipping off the surface.[1]

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[1] Colorado spends considerable time complaining about well development in Kansas, which is totally irrelevant except to the extent it has been forced on Kansas because of declines in stateline flows. *See,* Appendix A and discussion at 23-25. Unlike Colorado, Kansas is not violating state and federal law by diverting ground water. No stateline flows are being depleted by wells in Kansas.

In asserting that "the findings by the Colorado Water Judge in December 1976 that there was no competent evidence that stream flows had in fact suffered during the post-well period in Colorado or that reductions, if any, could be traced to well diversions rather than other causes" (*id.*, at 10), Colorado ignores perhaps the most important finding in regard to surface depletion, namely that "there is no dispute that well pumping depletes the river system . . .." *In re the Amendment of the Rules and Regulations Governing the Use, Control and Protection of Surface and Ground Water Rights Located in the Arkansas River and Its Tributaries,* Case Nos. W-4079, W-4080, W-4083, W-4084, and W-4085 (Dist. Ct., Water Division No. 2, Dec. 1, 1976), Finding No. 11, *aff'd sub. nom., Kuiper v. Atchison, Topeka & Santa Fe Ry.,* 195 Colo. 557, 581 P.2d 293 (1978).

Colorado fails to tell the Court that the studies relied on by the Colorado State Engineer,[2] were not discredited in the district court's findings. The thrust of the decision was the conclusion that the State Engineer's proposed amendment to the regulations was "arbitrary and capricious and invalid as a matter of law in that it was not" based on any *empirical* as opposed to what he termed "theoretical hydrological analyses." *Id.*, Conclusion No. 9 at 28; Finding No. 17 at 16.[3]

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[2] The studies were those the Colorado legislature authorized in S. 407 in 1967. *See,* Reply Brief and Brief in Support of Motion for Leave to File Complaint or Alternatively to Compel Compliance With Administrative Investigation Pursuant to Article VIII(H) of the Arkansas River Compact, at 7-8.

[3] The assertion that the Colorado district court's findings also support Colorado's conclusion "that well development in Colorado does not appear to have been a likely cause of the decline in usable stateline flows . . ." is also without foundation. While the district court did not expressly discredit the pre-1976 studies, Colorado totally hides from

Cont. p. 9

2. Trinidad Reservoir.

Colorado accuses Kansas of 'mischaracterizing' the Compact Administration's recommendation in the Resolution of January 4, 1982, that the Colorado State Engineer immediately release 18,290 acre feet of water unlawfully stored behind Trinidad Dam. Brief in Opposition to Motion for Alternative Relief, at 11. It is true that the resolution did not become "the Administration's recommendation," but only because of Colorado's negative vote.

At the meeting of the Arkansas River Compact Administration on December 14, 1982, Kansas proposed a similar resolution with respect to the subsequent unlawful storage of 20,000 acre feet in violation of "Article IV(D) of the Arkansas River Compact . . .." Minutes of the Arkansas River Compact Administration, Appendix C-1, December 14, 1982, at 44. Instead of voting negatively, Colorado offered a substitute motion denying that the storage was unlawful and urging that the Administration "shall not consider further the allegations of the State of Kansas that the 1979 and 1980 administration of Trinidad Reservoir violate[s] article IV(D) of the Arkansas River Compact . . .." *Id.*, at 44. Due to Colorado's position, no agreement was reached between the states.

Footnote 3, cont. from p. 8.

all of the post-1976 studies. Most of the studies relied on by Kansas in regard to the fact that the alluvial wells in Colorado have severely depleted the surface flows of the Arkansas River are post-1976 studies, *See, e.g.,* Simons, Li & Associates, Inc., "Preliminary Assessment – Development and Administration of Water Resources of the Arkansas River"; S. S. Papadopulos & Associates, Inc., "Report to the Arkansas River Compact Administration Regarding the Article VIII(H) Investigation of Alleged Violations of the Arkansas River Compact (December 6, 1985)"; S. S. Papadopulos & Associates, Inc., "Status Report on Evaluation of Streamflow Depletions Along the Arkansas River (February 17, 1986)".

Finally, Colorado's statement that "[t]he Kansas allegations concerning Trinidad Reservoir have not been the focus of the committee investigation . . . [because the Administration] requested the U.S. Bureau of Reclamation to initiate a review of the operating principles for the project . . ." is nonsense. Brief in Opposition to Motion for Alternative Relief, at 15. Colorado also argues "that the review by the Bureau . . . provides an adequate means to address its concerns about the operation of the project." This statement is also absurd. In its Review the Bureau agrees with Kansas that Trinidad Reservoir has been operated in violation of the Operating Principles. In a letter to the Bureau dated March 3, 1986, Colorado takes the same position that it took in its substitute motion on December 14, 1982.

Nothing has changed. Kansas and Colorado have different views of the legality of the operation of Trinidad Reservoir. The Bureau of Reclamation can't do anything about it, and Colorado refuses to submit the issue to arbitration or to allow it to be investigated pursuant to Article VIII(H).

3. Pueblo Reservoir.

Colorado states that "the only question that Kansas suggests should be investigated is whether Colorado complied with a July 24, 1951 resolution of the Administration . . . that there be no reregulation of native waters of the Arkansas River . . . until a plan of operation [has] been . . . approved by the Administration." Brief in Opposition to Motion for Alternative Relief, at 16. Colorado forgets that it initially agreed in the Resolution of March 28, 1985 that the "Arkansas River Compact Administration shall, in accordance with Article VIII(H) of the Arkansas River Compact, promptly investigate . . . the operation of Pueblo Dam and Reservoir . . . and the winter water storage program on the Arkansas River in Colorado . . .." On October 8, 1985, as discussed above, Colorado

repudiated its agreement to investigate the operation of Pueblo Reservoir.

It is Kansas' position that the winter water storage program and the operation of Pueblo Reservoir have adversely affected the regimen of the Arkansas River. Under Article V of the Compact, Kansas is entitled to 40 percent of the water entering the downstream conservation pool of John Martin Reservoir. Prior to 1976, when the storage program went into effect, winter inflows into John Martin averaged 17,400 acre feet annually; since then, the average inflows dropped to 10,900 acre feet.[4] *See, generally*, "Evaluation of the Arkansas River Winter Water Storage Program in Colorado," Spronk Water Engineers, Inc., at 66-68 (June 1985).

While Kansas is more interested in the water Colorado is converting through the operation of its winter water storage program, it is also interested in Colorado's continuing refusal to abide by the Compact Administration's Resolution of July 24, 1951. That Resolution approved the Fryingpan-Arkansas Project with the stipulation that Administration approval of a plan of operation would have to be obtained prior to any reregulation of native water, i.e., winter storage. *See, e.g.*, House Document No. 187, 83rd Congress, 1st Session (June 18, 1953); House Document No. 353, 86th Congress, 2nd Session (March 7, 1960); House Document No. 130, 87th Congress, 1st Session (March 15, 1961); House Report No. 694, 87th Congress, 1st Session (July 11, 1961); Senate Report No. 1742, 87th Congress, 2nd Session (July 19, 1962).

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[4] The difference of 6,500 acre feet annually may seem small to those unfamiliar with western water disputes. While the figure is a small percentage of the total amount of Colorado's postcompact depletions of stateline flows, it is more water than was involved in one of the Court's last interstate disputes, *viz.*, *Colorado v. New Mexico*, 459 U.S. 176 (1982), *dismissed*, 104 S.Ct. 2433 (1984).

In order to avoid the scrutiny of the Compact Administration pursuant to the Resolution of July 24, 1951, Colorado frivolously argues that the resolution related to the Gunnison-Arkansas Project and not the Fryingpan-Arkansas Project. The simple fact of the matter is that the Roaring Fork Diversion Unit of the Gunnison-Arkansas Project was renamed the Fryingpan-Arkansas Project for political reasons. Until Colorado's recent refusal to investigate the operation of Pueblo Reservoir and the winter water storage program, there was no doubt that the substance of the resolution was unaffected by the name change that was needed to secure the authorization of the project.

Colorado also attempts to avoid its obligation under the resolution by stating that "in any event, Kansas does not deny that the Administration failed to raise an objection to the winter storage program . . . for six years after its operation began . . .." Brief in Opposition to Motion for Alternative Relief, at 16. Laches, however, does not operate against a state in interstate water matters. *See,* Report of Special Master on His Decision and Supplemental Decision Regarding the Affirmative Defenses of New Mexico to the Complaint of Texas, July 6, 1977, at 12-13, *adopted, Texas v. New Mexico,* 434 U.S. 809 (1977).

4. Transmountain Return Flows.

Colorado admits that it has refused to investigate transmountain return flows, but urges inappositely that "[w]ater imported into the Arkansas River Basin is not apportioned to Kansas under" Articles III(B) or IV(A) of the Arkansas River Compact. Kansas has not alleged an entitlement to transmountain waters under the Compact. It is uncontroverted, however, that these transmountain returns add water to the Arkansas River that "mask . . . depletions [of native water] which will continue if these . . . flows are removed from the river." Minutes

of the Arkansas River Compact Administration Meeting, October 8, 1985, at 26. Consequently, the issue of returns is hardly "hypothetical" and the Administration *must* know the amount of the returns to quantify the depletions of native water under Article VIII(H).

In addition to Colorado's refusal to cooperate in order that its courts might approve programs of return flow utilization,[5] Colorado also tries to justify its refusal to quantify return flows by arguing that "it would be difficult, if not impossible, to do so . . .." Brief in Opposition to Motion for Alternative Relief, at 17. This alleged difficulty is belied by Colorado law. In order to obtain a court decree approving a program of return flow utilization, the applicant must be able to isolate the returns from native returns. In Colorado Springs' application, for example, it is asserted in paragraph 6(a)(iv) that:

> Colorado Springs will utilize appropriate measurement and/or accounting methods to determine accurately on a daily basis the portion of return flows of the Fountain Creek that is attributable to return flows from the Transmountain Sources . . ..

See, "City of Colorado Springs, Arkansas River Review Exchange Plan," Gronning Engineering Co., Denver, Colorado, March, 1986. *See, generally,* "Application for an Absolute Right for Existing Exchange and Reuse Program and for a Conditional Decree for a Proposed Exchange and Reuse Program in the Arkansas River and Its Tributaries," Water Division No. 2, Case No. 84-CW-203; *see, also,* Application of the Board of Water Works of Pueblo, Colorado, Case No. 84-CW-177.

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[5] Colorado's tactic is legally unsound because its courts have no authority to define its obligations under a compact. *See, West Virginia ex rel Dyer v. Sims,* 341 U.S. 22 (1951). Nevertheless, as a practical matter, Colorado is seeking to tie up the only wet water that's still in the river.

Transmountain return flows in the Arkansas River are neither hypothetical nor metaphysical. They are an essential matter that Colorado refuses to investigate.[6] There is no possibility that Colorado will even discuss the matter – its representative to the Administration's Investigation Committee has "ruled out" any assessment of transmountain returns. *See,* Minutes of the Arkansas River Compact Administration Meeting, October 8, 1985, at 32.

POINT II

THIS COURT SHOULD EXERCISE ITS DISCRETIONARY AUTHORITY BY ENJOINING COLORADO'S POSTCOMPACT WELL USES UNTIL COMPLETION OF A MEANINGFUL ADMINISTRATIVE INVESTIGATION.

Colorado has noted the traditional requisites of injunctive relief and that the issuance of the equitable order rests in the sound discretion of the Court. While Kansas has no quarrel with these elements in theory, Colorado's application of the elements to the facts misses the mark.

Colorado asserts that there is no threat of irreparable harm to Kansas, while ignoring its unilateral refusal to investigate the documented finding that the proliferation of wells has

---

6 There are nine structures that divert water into the Arkansas River Basin from the Colorado River Basin. The mean annual transmountain diversion before the Arkansas River Compact was adopted was 16,430 acre feet. In the postcompact period 1949-1973, the mean annual diversion was 68,950 acre feet. In the critical period 1974-1984, when Colorado depleted the stateline flows by approximately 50,000 acre feet annually (without accounting for the masking), the mean was 137,450 acre feet. In other words, the amount of masking of native depletions in violation of the Compact is not small.

caused 150,000 acre-feet per year of depletion to the Arkansas River. *Preliminary Assessment – Development and Administration of Water Resources of the Arkansas River, Art. IV.* This continuing damage is not imaginary; it is immediate, continuing, and cannot begin to be rectified until Colorado complies with the mandate of Article VIII(H) of the Compact. *United States v. W. T. Grant Co.*, 345 U.S. 629 (1953) (recurrent injury provides basis for injunctive relief); *Chance v. Board of Examiners,* 561 F.2d 1079 (2d Cir. 1977) (continuing violations constitute irreparable harm). In the meantime, however, Colorado proposes that Kansas idly ignore the substantial depletions in stateline flows until Colorado benevolently decides to honor its compact obligations.

The resulting injury to Kansas is apparent. Due to Colorado's unregulated pumping from the aquifer hydraulically connected to the live river above John Martin Reservoir, "the average stateline flow during the period of 1974 through 1979 was 55 cfs, a major reduction." As illustrated in Appendix A, Colorado's acquiescence in unregulated well pumping has resulted in a marked reduction of ditch deliveries to Kansas for irrigation.

This damage cannot be hidden by Colorado's assertion that "Kansas water users have an alternative source of supply available from wells." Colorado's Brief in Opposition to Motion for Alternative Relief, at 19. The fact is that Kansas has been forced to make up the deficiency in surface deliveries by tapping the nonrenewable ground water of the Ogallala aquifer. During 1979 through 1980, Kansas' necessary appropriations of ground water have caused the Ogallala aquifer to decline from 20 to 80 feet. L. Dunlap, R. Lindgen & C. Surer, *U.S. Geological Survey – Water Supply Paper 2253,* at 48 (1985).

Given the substantial depletion of the Ogallala aquifer caused by Colorado's continuing reduction of stateline surface flows, the suggestion that Kansas has no irreparable harm and "has

no substantial likelihood of success on [its] claim" is implausible. Colorado's Brief in Opposition to Motion for Alternative Relief, at 19. Certainly Kansas will not succeed on the merits if Colorado continues to stonewall the administrative process. With a meaningful determination of surface flow declines, however, Kansas' entitlement to its apportioned share of the Arkansas River flow cannot be seriously disputed. Pending that determination, Colorado should be enjoined from all post-compact well uses in the Arkansas River Valley.

CONCLUSION

In Justice Brennan's opinion for the Court in *Texas v. New Mexico*, 462 U.S. 554 (1982), it was noted that access to the Court's original jurisdiction raises a question of "the *practical necessity* of an original forum in this Court for particular disputes within our constitutional original jurisdiction." *Id.*, at 570 (emphasis added). Despite the mandatory command of Article VIII(H) of the Compact, Colorado has repeatedly refused to investigate Kansas' allegations of violation. If Kansas is denied the remedy contemplated in Article III, Section 2, Clause 2 of the Constitution of the United States, Colorado

could "for all practical purposes, avoid [this forum] at will." *Texas v. New Mexico*, 462 U.S. 554, 569 (1982).

Respectfully submitted,

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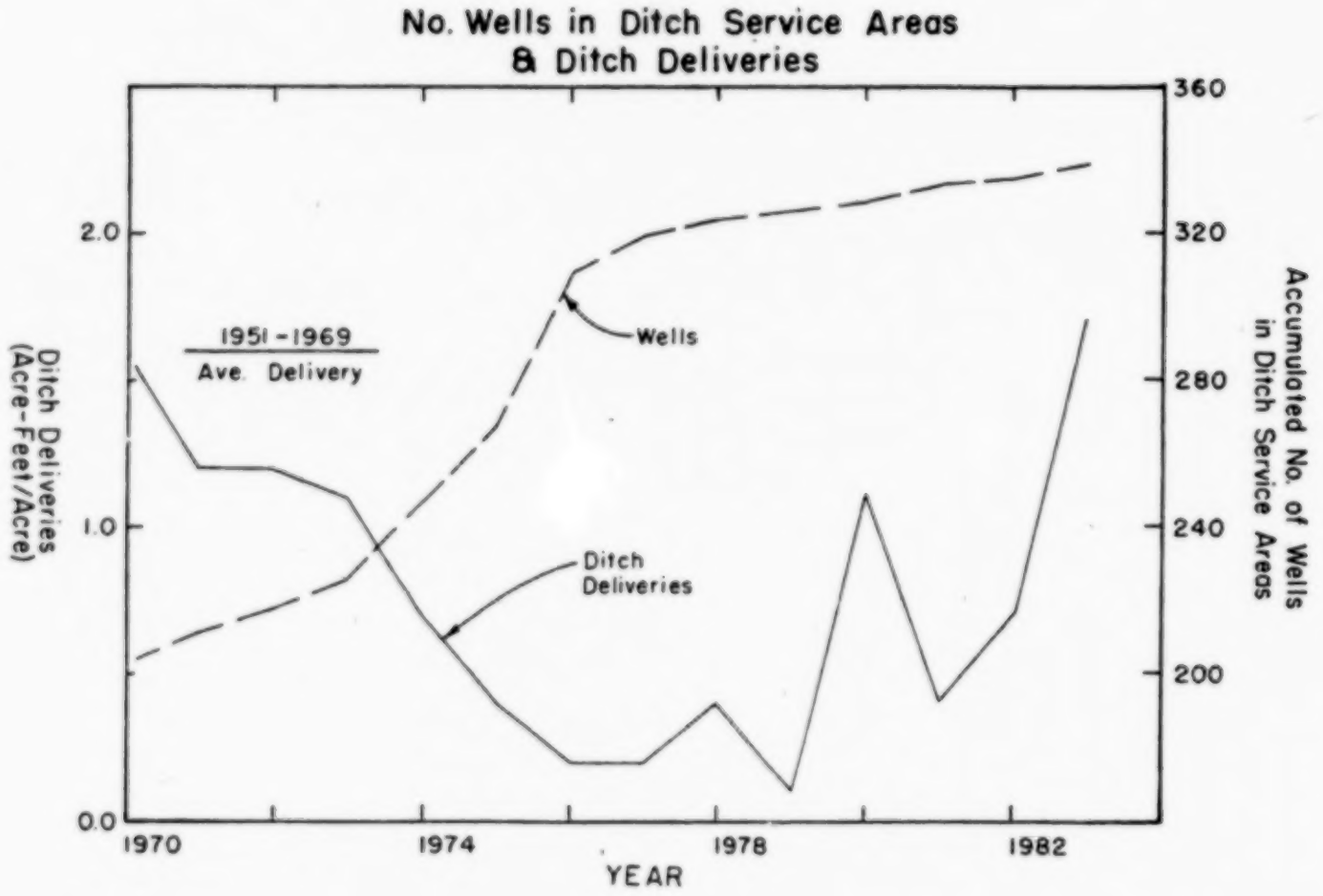
No. Wells in Ditch Service Areas
& Ditch Deliveries
Ditch Deliveries (Acre-Feet/Acre)
Accumulated No. of Wells in Ditch Service Areas
2.0
1.0
0.0
360
320
280
240
200
1970
1974
1978
1982
YEAR
1951 - 1969
Ave. Delivery
Wells
Ditch Deliveries

APPENDIX A

CERTIFICATE OF SERVICE

Pursuant to Rule 28(5) of the Supreme Court Rules, I certify that three copies of the foregoing Reply to Colorado's Brief in Opposition to Motion for Alternative Relief were served on March 18, 1986 on:

David W. Robbins
Hill & Robbins
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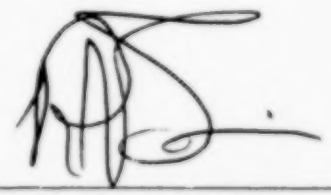

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Supreme Court, U.S.
FILED
MAY 22 1986
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CLERK

No. 105, Original

IN THE

Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,
Plaintiff,

v.

STATE OF COLORADO,
Defendant.

COLORADO'S ANSWER, COUNTERCLAIM, AND MOTION FOR APPOINTMENT OF SPECIAL MASTER

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~~March~~ May 22, 1986

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October Term, 1985

STATE OF KANSAS,
Plaintiff,

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Defendant.

COLORADO'S ANSWER, COUNTERCLAIM, AND MOTION FOR APPOINTMENT OF SPECIAL MASTER

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ANSWER

Defendant, the State of Colorado, for its answer to the complaint filed in the above-captioned action by Plaintiff, the State of Kansas, states:

1. Defendant admits the Court has jurisdiction under the allegations in paragraph 1 of the complaint. Defendant denies that this is an appropriate case for the Court to exercise such jurisdiction because Plaintiff has failed to exhaust its administrative remedies under Article VIII. of the Arkansas River Compact.

2. Defendant admits the allegations in paragraph 2 of the complaint.

3. Defendant admits the allegations in paragraph 3 of the complaint.

4. Defendant admits that one of two major purposes of the Arkansas River Compact is quoted in paragraph 4 of the complaint. Defendant denies the allegations of paragraph 4 insofar as they assert that the purpose set forth in Article I.B. of the Compact is the "principal" purpose of the Arkansas River Compact.

5. Defendant admits that a portion of Article IV.D. of the Arkansas River Compact is quoted in paragraph 5 of the complaint. Defendant denies the allegations of paragraph 5 insofar as they assert Plaintiff's interpretation of Article IV.D.

6. Defendant admits that a portion of the first sentence of Article V.F. of the Arkansas River Compact is quoted in paragraph 6 of the complaint. The first sentence of Article V.F. in its entirety reads as follows:

> In the event the Administration finds that within a period of fourteen (14) days the water in the conservation pool will be or is liable to be exhausted, the Administration shall forthwith notify the State Engineer of Colorado, or his duly authorized representative, that

commencing upon a day certain within said fourteen (14) day period, unless a change of conditions justifies cancellation or modification of such notice, Colorado shall administer the decreed rights of water users in Colorado Water District 67 as against each other and as against all rights now or hereafter decreed to water users diverting upstream from John Martin Dam on the basis of relative priorities in the same manner in which their respective priority rights were administered by Colorado before John Martin Reservoir began to operate and as though John Martin Dam had not been constructed.

Defendant affirmatively alleges that the Arkansas River Compact Administration by resolution in 1980 adopted an operating plan for John Martin Reservoir which modifies the method by which the Administration finds that the water in the conservation pool is exhausted for the purposes of Article V.F.

7. Defendant denies the allegations in paragraph 7 of the complaint.

8. Defendant denies the allegations in paragraph 8 of the complaint.

9. Defendant denies the allegations in paragraph 9 of the complaint.

10. Defendant admits that for more than twenty years its agencies or officials have investigated ground water appropriations in the Arkansas River Basin in Colorado. Defendant denies the remaining allegations of paragraph 10 of the complaint.

11. Defendant denies the allegations in paragraph 11 of the complaint.

12. Defendant admits that the Arkansas River Compact Administration was in the process of conducting an investigation of alleged Compact violations pursuant to Article VIII.H. of the Arkansas River Compact at the time Plaintiff commenced this proceeding on December 16, 1985, and that

Defendant refused to enjoin all post-compact ground water appropriations in Colorado during the pendency of the investigation. Defendant admits that the Colorado representatives to the Arkansas River Compact Administration rejected requests by the Kansas representatives to investigate the consequences of possible future increases in the consumption of Colorado's "transmountain" return flows. Defendant denies the remaining allegations of paragraph 12 of the complaint.

13. Defendant denies the allegations in paragraph 13 of the complaint.

14. Defendant denies the allegations in paragraph 14 of the complaint.

15. Defendant denies the allegations in paragraph 15 of the complaint.

AFFIRMATIVE DEFENSES

1. Plaintiff failed to exhaust its administrative remedies under Article VIII. of the Arkansas River Compact.

2. Plaintiff's claims against Defendant are barred by laches, estoppel, waiver, or the equitable doctrine of unclean hands.

3. With regard to Plaintiff's claim that Defendant and its water users have materially depleted the usable and available stateline flows of the Arkansas River since the adoption of the Compact to the injury of water users in Kansas under the Compact, Defendant asserts that irrigation in the Arkansas River basin in Colorado has declined since the adoption of the Compact and that acreage under irrigation in western Kansas has increased at least five-fold in the same period, from approximately 56,000 acres in 1948 to 350,000 acres in 1980. Plaintiff seeks to have this Court rewrite the Arkansas River Compact to impose a new stateline delivery obligation on Colorado so as to maintain a post-compact well economy in western Kansas, all at the expense of Colorado water users, contrary to the express terms of the Compact.

4. Waters brought into the Arkansas River basin from other river basins are not apportioned to Kansas under the Arkansas River Compact and Plaintiff has no claim or right to such waters.

5. In 1980, the Arkansas River Compact Administration approved an operating plan for John Martin Reservoir pursuant to which water stored in the conservation pool of the reservoir is transferred into separate storage accounts for Kansas and ditches in Colorado Water District 67 at agreed upon rates and is apportioned into the accounts in agreed upon percentages. Based upon a series of agreements among Colorado water users, after water stored in the conservation pool is fully transferred to the separate storage accounts, but not necessarily released from the reservoir, Colorado reverts to administration of decreed priorities and the decreed rights of water users in Colorado Water District 67 are administered as against rights decreed to water users diverting upstream from John Martin Dam on the basis of relative priorities in the same manner as though John Martin Dam had not been constructed. The Colorado representatives approved the operating plan in 1980 and have allowed the operating plan to remain in effect from year-to-year thereafter, to the substantial benefit of Kansas water users, based upon the aforesaid agreements among Colorado water users to determine when a "call" by ditches in Colorado Water District 67 will be enforced above John Martin Reservoir. Those agreements were in turn based on an agreement to permit storage of historical direct-flow winter diversions upstream from John Martin Reservoir. Plaintiff has accepted the benefits of the 1980 operating plan and agreed to its terms with knowledge of the agreements among Colorado water users and with knowledge that the 1980 operating plan would change the regimen of the Arkansas River. Therefore, by having accepted the benefits of the 1980 operating plan, Plaintiff is barred from asserting that any reregulation of the native waters of the Arkansas River be approved by the Compact Administration based upon the Administration's Resolution of July 24, 1951.

6. With regard to Plaintiff's allegation that Defendant, through its Compact "Commissioner", has rejected and continues to reject Plaintiff's requests to investigate Defendant's "unilateral rejection" of the Arkansas River Compact Administration's Resolution of July 24, 1951, Defendant denies that the Resolution has any binding effect on Defendant. In the alternative, the Resolution was amended by the Administration on January 4, 1982. Further, Plaintiff failed to raise an objection to the winter storage program in Pueblo Reservoir for six years after it began operation in 1975 with the full knowledge of Plaintiff and the Administration.

COUNTERCLAIM

Defendant, the State of Colorado, by its Attorney General, asserts the following counterclaim against Plaintiff, the State of Kansas.

1. The Court has jurisdiction of this counterclaim under Article III, Section 2, Clause 2 of the Constitution of the United States, and Paragraph (a), Subsection (1), Section 1251, Title 28 of the United States Code.

2. The Arkansas River is an interstate stream which rises in the Rocky Mountains near Leadville, Colorado, then flows southeasterly to Salida, Colorado, then east through Canon City to Pueblo, Colorado, then across the plains of eastern Colorado into the State of Kansas.

3. In order to settle existing disputes and to remove causes of future controversy concerning the waters of the Arkansas River and to equitably divide and apportion between the States of Colorado and Kansas the waters of the Arkansas River, as well as the benefits arising from the construction, operation, and maintenance of John Martin Reservoir for water conservation purposes, the States of Colorado and Kansas ratified the Arkansas River Compact, which Compact was approved by the United States Congress by Act of May 31, 1949, 63 Stat. 145.

4. Article V.E.(2) of the Arkansas River Compact provides: "Water released upon concurrent or separate demands shall be applied promptly to beneficial use unless storage thereof downstream [from John Martin Reservoir] is authorized by the [Arkansas River Compact] Administration."

5. On information and belief, the state officials charged with administration of water rights in Kansas have allowed water released from John Martin Reservoir upon demand by Kansas under Article V. of the Arkansas River Compact to be stored downstream in Lake McKinney in Kansas rather than being applied promptly to beneficial use, in violation of the provisions of Article V.E.(2) of the Compact.

6. Subsequent to the approval of the Arkansas River Compact by the United States Congress in 1949, state officials charged with the administration of water rights in Kansas have allowed the construction of wells and have permitted ground water appropriations in Kansas that have materially depleted the usable quantity or availability for use to the surface water users in Kansas under the Compact. Those depletions caused Kansas to make additional demands for releases of water stored in John Martin Reservoir pursuant to the Compact to the detriment of water users in Colorado.

7. Irreparable injury to the State of Colorado and water users in Colorado under the Compact has been caused by the acts and conduct of the State of Kansas, its officers, and citizens in permitting the use of the waters of the Arkansas River in violation of the terms of the Compact.

WHEREFORE, having fully answered and having asserted its affirmative defenses and counterclaim, Defendant prays that the Court grant judgment for Defendant and against Plaintiff on the claims of Plaintiff, that the Court issue its decree compelling the State of Kansas, its officers, and citizens to comply with the provisions of the Arkansas River Compact, that

Defendant have and recover its reasonable costs, and for such other and further relief as the Court may deem just and proper under the circumstances.

Respectfully submitted,

DUANE WOODARD
Attorney General of Colorado

CHARLES B. HOWE
Chief Deputy Attorney General

RICHARD H. FORMAN
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Attorneys for Defendant
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MOTION FOR APPOINTMENT OF SPECIAL MASTER

Defendant, the State of Colorado, by its Attorney General, respectfully moves the Court to appoint some suitable person as Special Master in this action and to refer this matter to him or her with authority to take evidence and to report the same to the Court with his or her findings of fact, conclusions of law, and recommendations for decree, all to be subject to approval or other disposition by this Court.

In support of this motion Defendant calls the attention of this Court to the pleadings, an inspection of which discloses many issues of fact which cannot be tried conveniently except by the appointment of a Special Master.

Respectfully submitted,

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Attorney General of Colorado

CHARLES B. HOWE
Chief Deputy Attorney General

RICHARD H. FORMAN
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IN THE

Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,
Plaintiff,

v.

STATE OF COLORADO,
Defendant.

KANSAS' REPLY TO COLORADO'S COUNTERCLAIM

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No. 105, Original

IN THE

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STATE OF KANSAS,
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v.

STATE OF COLORADO,
Defendant.

KANSAS' REPLY TO COLORADO'S COUNTERCLAIM

Pursuant to Rule 9 of the Rules of the Supreme Court and Rule 7 of the Rules of Civil Procedure, the plaintiff, State of Kansas, replies to the State of Colorado's counterclaim by stating:

1. The plaintiff admits the allegation of jurisdiction in paragraph one.

2. The plaintiff admits the allegations in paragraphs two, three, and four.

3. The plaintiff denies the allegation of malfeasance on the part of officials charged with the administration of water rights in Kansas in paragraph five and further denies that Kansas water users have not promptly applied water to beneficial use as provided in Article V(E)(2) of the Arkansas River Compact.

4. The plaintiff denies the allegations in paragraph six.

5. The plaintiff denies the allegations in paragraph seven.

AFFIRMATIVE DEFENSES

1. As defined in Article III(B) of the Arkansas River Compact, the waters of the Arkansas River controlled by the Compact are those waters "originating in the natural drainage of the Arkansas River, including its tributaries, upstream from the Stateline . . . ." Accordingly, any depletion of surface flow of the Arkansas River in Kansas which might occur as a result of ground water diversions in Kansas, could not affect Colorado's obligation to make deliveries of usable stateline flows pursuant to the Arkansas River Compact.

2. Diversions of ground water in Kansas violate no interstate compact or federal law.

3. Any use of ground water in Kansas is irrelevant to the substantial, postcompact decline in usable stateline flows caused by the State of Colorado and its water users, except to the extent that Colorado's failure to deliver stateline flows has forced Kansas users, to their injury, to rely alternatively on ground water sources of supply below the stateline.

WHEREFORE, the State of Kansas respectfully prays that the Court issue its decree commanding the State of Colorado, its officers, citizens, and political subdivisions to deliver the waters of the Arkansas River in accordance with the provisions of the Arkansas River Compact and providing for such other and further relief as the Court may deem appropriate.

Respectfully submitted,

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CERTIFICATE OF SERVICE

Pursuant to Rule 28(5) of the Supreme Court Rules, I certify that twelve copies of the foregoing Kansas' Reply to Colorado's Counterclaim were served on June 10, 1986 on:

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Denver, Colorado 80202

RICHARD A. SIMMS
Special Assistant Attorney General
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No. 105 Original

Supreme Court, U.S.
FILED
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CLERK

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October Term, 1985

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Plaintiff,

v.

STATE OF COLORADO
Defendant.

MOTION TO REFER MOTION FOR LEAVE TO AMEND COMPLAINT

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January 27, 1989

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4117

No. 105 Original

In The Supreme Court

Of The United States

October Term, 1985

STATE OF KANSAS
Plaintiff,

v.

STATE OF COLORADO
Defendant.

MOTION TO REFER MOTION FOR LEAVE TO AMEND COMPLAINT

The State of Kansas hereby moves the Court to refer the attached Motion for Leave to Amend Complaint to the Special Master, the Honorable Arthur L. Littleworth, for his findings, conclusions, and recommendations.

In support hereof, Kansas states:

1. Kansas filed its motion for leave to file complaint on December 16, 1985.

2. On February 14, 1986, Colorado filed its brief in opposition for leave to file, based solely on the alleged failure to have exhausted administrative remedies.

3. On March 4, 1986, Kansas replied by filing an alternative motion to compel Colorado's compliance with an administrative investigation by the Arkansas River Compact Administration pursuant to Article VIII-H of the Compact. Act of May 31, 1949, 63 Stat. 145.

4. Following further argument over the issue of exhaustion, the Court granted leave to file the complaint on March 24, 1986.

5. In its answer, Colorado raised the alleged failure to exhaust administrative remedies as an affirmative defense.

6. Since leave to file was granted, the parties have been preparing for trial. The case is set for trial commencing on January 15, 1990.

7. Following a status conference on February 26, 1988, by order of March 14, 1988, the Special Master set May 13, 1988, as the deadline within which Colorado could move for partial summary adjudication on the basis of the alleged failure to exhaust administrative remedies.

8. Colorado again raised the alleged failure to exhaust administrative remedies in its motion to stay proceedings on May 12, 1988.

9. By his Decision of Special Master on Colorado Motion to Stay, the Special Master denied the motion on October 21, 1988.

10. On November 26, 1988, by direction of the Special Master, Colorado filed a second motion to stay, alleging failure to exhaust administrative remedies with respect to one allegation of compact violation not embraced by the first motion to stay. Simultaneously, Colorado filed a motion for partial summary judgment on an alleged factually undisputed legal question.

11. Kansas has responded to the motion to stay and the motion for partial summary judgment before the Special Master simultaneously with this filing with the Court. Kansas' Response to Colorado's Second Motion to Stay is attached hereto and incorporated herein as Appendix A.

12. While wholly lacking on its merits, Colorado's second motion to stay raised past and continuing violations by Colorado of Article V-E-3, V-E-4, and V-H-2 of the Arkansas River Compact.

13. The factual allegations of material depletion of stateline flows which underlie the violations of Article V-E-3, V-E-4, and V-H-2, were alleged in the original complaint.

14. The violations of Article V-E-3, V-E-4, and V-H-2 raise no new issues of fact, but present questions of law and equity.

15. The grant of Kansas' motion to amend would not raise additional questions of alleged failure to exhaust administrative remedies.

16. The grant of Kansas' motion to amend complaint to express an allegation of violation of Article V-E-3, V-E-4, and V-H-2 would not increase trial preparation time or delay the trial setting.

17. The State of Colorado would not be prejudiced by the granting of Kansas' motion to amend complaint.

18. An understanding of Kansas' motion to amend complaint rests on Kansas' Response to Colorado's Second Motion to Stay, attached hereto as Appendix A, which is presently pending before the Special Master.

WHEREFORE, the State of Kansas moves that the Court refer the attached Motion for Leave to Amend Complaint to the Special Master for his findings, conclusions, and recommendations.

Respectfully submitted,

ROBERT T. STEPHAN
Attorney General of Kansas

JOHN W. CAMPBELL
Deputy Attorney General

LELAND E. ROLFS
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In The Supreme Court

Of The United States

October Term, 1985

STATE OF KANSAS
Plaintiff,

v.

STATE OF COLORADO
Defendant.

MOTION FOR LEAVE TO AMEND COMPLAINT

The State of Kansas hereby moves to amend its complaint by adding thereto the following allegation:

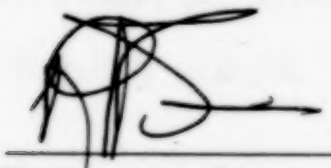
> The State of Colorado has failed and continues to fail to make deliveries of releases to which Kansas is entitled from John Martin Reservoir by an equivalent in stateline flow, as required by Article V-E-3 of the Compact, and in violation of Articles V-E-4 and V-H-2.

Respectfully submitted,

ROBERT T. STEPHAN
Attorney General of Kansas

JOHN W. CAMPBELL
Deputy Attorney General

LELAND E. ROLFS
Assistant Attorney General



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In The Supreme Court

Of The United States

STATE OF KANSAS
Plaintiff,

v.

STATE OF COLORADO
Defendant.

CERTIFICATE OF SERVICE

I, Richard A. Simms, hereby certify that I caused to be mailed three copies of Kansas' Motion to Refer Motion to Amend Complaint and Motion to Amend Complaint to be served by first-class mail on the following this 27th day of January, 1989:

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Special Master, United States Supreme Court
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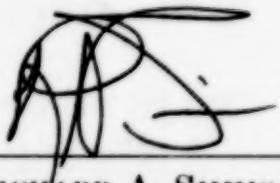

RICHARD A. SIMMS
Special Assistant Attorney General
Counsel of Record

APPENDIX A
No. 105 Original

IN THE
Supreme Court of the United States
October Term, 1985

BEFORE THE HONORABLE ARTHUR L. LITTLEWORTH,
SPECIAL MASTER

STATE OF KANSAS
Plaintiff,

v.

STATE OF COLORADO
Defendant.

KANSAS' RESPONSE TO COLORADO'S SECOND MOTION TO STAY

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No. 105 Original

In The Supreme Court

Of The United States

October Term, 1985

BEFORE THE HONORABLE ARTHUR L. LITTLEWORTH,
SPECIAL MASTER

STATE OF KANSAS
Plaintiff,

v.

STATE OF COLORADO
Defendant.

AFFIDAVIT OF DAVID L. POPE

STATE OF KANSAS
COUNTY OF SHAWNEE } ss:

I, DAVID L. POPE, being first duly sworn, upon oath state:

1. That I am presently employed by the Division of Water Resources, Kansas State Board of Agriculture as the Chief Engineer-Director and have been so employed since March 1, 1983. I am the chief state official charged with the administration of water rights in the State of Kansas.

2. That since March 1983 I have been, and am, one of the three Kansas representatives on the Arkansas River Compact.

3. That on March 28, 1985, the Arkansas River Compact Administration adopted a Resolution in Garden City, Kansas, initiat-

ing an investigation under Article VIII-H of the Arkansas River Compact.

4. That Resolution designated me, by virtue of my position as Chief Engineer of the State of Kansas, to be the Kansas representative on the committee to conduct the investigation.

5. That Mr. J. William McDonald, Director, Colorado Water Conservation Board, Department of Natural Resources, was designated by the Resolution as the Colorado representative on the investigation committee.

6. That by telephone conversation on April 10, 1985 and through an exchange of letters dated April 11, 1985 and May 2, 1985, I agreed with Mr. McDonald that each state would initially draft a scope of work concerning that state's allegations against the other state.

7. That these draft scopes of work were discussed at a meeting on May 7, 1985. For various reasons, Mr. McDonald disagreed with the scope of work which I had proposed as to how the committee should investigate Kansas' allegations.

8. That at the conclusion of the May 7, 1985 meeting, Mr. McDonald agreed to prepare and mail to me on May 21 or May 22 a proposed scope of work as to how Colorado would proceed to investigate the allegations made by the State of Kansas, including how to investigate the winter water storage program at Pueblo Reservoir.

9. By a letter which I received May 28, 1985, from Mr. McDonald, he proposed an entirely different plan of investigation for the Kansas allegations, including investigation of "Pueblo Dam and Reservoir, Winter Storage Program, and well development above John Martin Reservoir." The basic thrust of Mr. McDonald's proposed scope of investigation was to prepare a series of mass diagrams comparing flows at various gages for the periods 1949 to 1984. The purpose of this mass diagram analysis was merely to determine whether inflows to

John Martin Reservoir had declined and, if so, the extent of such declines. It was recognized by both of us that a mass diagram analysis could not determine the causes of such declines.

10. On June 3, 1985, the Committee met in Kansas City and agreed to temporarily defer consideration of a complete scope of work and to define a preliminary scope of work to include compilation of data and the construction of a series of mass diagrams which could be used to analyze changes in river flow at various points in the basin without committing either state to a final scope of work or to include any future analysis that might be needed.

11. That because the nature of the mass diagram investigation was to determine where reductions in flow had taken place, and the extent thereof, not to identify the causes of the reduction, the existence of items, such as the "Spronk Report," became irrelevant to the investigation until such time as a search for the causes of material depletion was resumed.

Further affiant says naught.

Dated this 24th day of January, 1989.

(Signed)
David L. Pope, P.E.
Chief Engineer-Director
Division of Water Resources
Kansas State Board of Agriculture

Subscribed and sworn to before me this 24th day of January, 1989.

/s/ DENISE J. ROLFS
Notary Public

My commission expires March 1, 1990.

No. 105 Original

In The Supreme Court

Of The United States

October Term, 1985

BEFORE THE HONORABLE ARTHUR L. LITTLEWORTH,
SPECIAL MASTER

STATE OF KANSAS
Plaintiff,

v.

STATE OF COLORADO
Defendant.

KANSAS' RESPONSE TO COLORADO'S SECOND MOTION TO STAY

Introduction

Colorado has moved to stay any claim by Kansas that the operation of the winter water storage program has materially depleted the Arkansas River in violation of Article IV-D of the Arkansas River Compact "based upon Kansas' failure to exhaust administrative remedies." Motion to Stay, November 28, 1988. While Colorado suggests that the Arkansas River Compact Administration did not investigate the winter water storage program in Pueblo Reservoir, its motion to stay is not based on an alleged failure to investigate. Rather, Colorado argues its motion on two discrete grounds: 1) Kansas' "failure to present the Spronk report to the Compact Administration during the 1985 investigation;" and 2) Kansas' refusal "to review the decree for the winter water storage program unless

Colorado agreed that it was being submitted to the Compact Administration for its approval . . .." Brief in Support of Motion to Stay at 2. Notwithstanding all of the rhetoric, the motion to stay has no other basis.

A review of the "material facts not in dispute" results in three unequivocal conclusions: 1) the Arkansas River Compact Administration did investigate depletions caused by the winter storage program until that investigation was terminated by Colorado; 2) the Spronk report was made unnecessary and irrelevant to the administrative investigation by actions of Colorado; and 3) Kansas' refusal to review the winter storage decree in 1987 had no bearing on the administrative investigation in 1985. Once properly explained, the facts show that Kansas has exhausted its administrative remedies with respect to the winter water storage program in Pueblo Reservoir to the same extent that it has exhausted its remedies with respect to all of its other allegations of compact violations.

Statement of Facts

The Article VIII-H Administrative Investigation of the Winter Storage Program

Colorado's position is conspicuous for its ambivalence. In its brief in support of its motion to stay, Colorado suggests that the administrative investigation under Article VIII-H "did not specifically include the winter storage program . . .." *Ibid.* at 20. Colorado further states that "[i]t was not until Kansas filed its March 18, 1986 brief that Colorado learned that Kansas intended to assert that the winter storage program had adversely affected the regimen of the Arkansas River . . .." *Id.* at 24.

Colorado's understanding of the matter was different when the administrative investigation was being conducted and when the suit was filed. In its brief in opposition to the motion for leave to file of February 14, 1986, Colorado argued rather strenuously that the Court should not exercise its jurisdiction because the "Administra-

tion [had] agreed to investigate the operation of Pueblo Reservoir . . .." *Id.* at 19-20. More specifically, Colorado explained its role this way: "Furthermore, the Colorado representatives agreed in the resolution of March 28, 1985, to investigate the operation of the winter storage program in Pueblo Reservoir . . .." *Id.* at 19.

It is clear that the Arkansas River Compact Administration conducted an investigation of the winter water storage program until Colorado terminated the investigation on October 4, 1985.[1] On March 28, 1985, at Kansas' behest, the Administration formally resolved to promptly investigate:

> 1. Whether the waters of the Arkansas River have been or are being materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under the Compact by:
>
> a. the operation of the Trinidad Dam and Reservoir Project, Colorado,
>
> b. *the operation of Pueblo Dam and Reservoir, Colorado, and the winter water storage program on the Arkansas River in Colorado,*
>
> c. well development of the waters of the Arkansas River in Colorado, and
>
> d. well development of the waters of the Arkansas River in Kansas . . ..

Ex. No. 28 (L) (Emphasis added).

[1]Colorado asserts that no claim of material depletion as a result of the operation of the winter storage program in Pueblo Reservoir "was expressly made in Kansas' complaint." Brief in Support of Motion to Stay at 1. If the claim is not within the complaint, of course, the motion to stay is obviously unnecessary.

The allegation falls within ¶¶ 7-9 of the complaint. Detailed factual averments are not necessary under Rule 8. *Conley v. Gibson*, 355 U.S. 41, 47-48 (1957).

Pursuant to the Resolution, an Article VIII-H Investigation Committee was created. It subsequently met seven times. Before the first meeting in Denver on May 7, 1985, each state prepared a "scope of work" addressing its allegations. Colorado outlined the work necessary to investigate its allegations concerning the operation of Lake McKinney. Kansas outlined the investigation of the effects of post-compact wells and certain administrative practices and operations in Trinidad and Pueblo reservoirs, specifically including the operation of the winter water storage program in Pueblo Reservoir. *See* Ex. No. 29. The methodology adopted by the Investigation Committee and the exchanges that took place during its seven meetings in 1985 are detailed in Kansas' response to Colorado's original motion to stay. *Ibid.* at 11-15.

Colorado now argues that the Article VIII-H investigation did not purport to evaluate the effects of the winter storage program. Brief in Support of Motion to Stay at 20. As noted before, however, the Investigation Committee agreed to compile the requisite data and construct some fifty-four double and single mass diagrams to analyze changes in river flow. The Kansas and Colorado representatives failed to agree on the interpretation of the mass diagrams, including what the diagrams indicated regarding the flows at the gage labeled "Arkansas River at Las Animas," which measures flows in the reach where the winter water storage program takes place.[2] In this regard, the Kansas representative, David Pope, submitted a report entitled "Report to the Arkansas River Compact Administration Regarding the Article VIII(H) Investigation of Alleged Violations of the Arkansas River Compact," which presented Kansas' interpretation of the relevant mass diagrams, Figures 13 and 14:

[2]The Fryingpan-Arkansas Project was designed to increase water supplies in the Arkansas River through transmountain importation, conservation of flood flows, and re-regulation of winter flows in Pueblo Reservoir. Act of August 16, 1962, P.L. 87-590, 76 Stat. 389, 43 U.S.C. § 616. It was contemplated that the ditches above John Martin Reservoir, *i.e.*, above the Las Animas gage, would forego winter diversions in exchange for the storage of the water in Pueblo Reservoir and certain other off-channel reservoirs. The object was to release the water during the irrigation season, thus optimizing its beneficial use.

> 4. The winter flows (November-March) of the Arkansas River at Las Animas have declined starting in about 1974. This decline is on the order of 5,000 to 7,000 acre-feet per season.
>
> 5. The flow of the Arkansas River at Las Animas declined during the 1949-1973 period by 112,000 acre-feet per year to 48% of the pre-compact average.
>
> 6. The declines in flow referred to above have exceeded those which would have been caused solely by the hydrologic variations which occurred during the 1970s and in part have been caused by factors other than hydrology.[3]

Ex. No. 47 at 22.

In the countervailing report of September 6, 1985, by William McDonald, the Colorado representative, Figures 13 and 14 were characterized quite differently, *i.e.*, as showing "[no] increased depletions to the flow of the Arkansas River at Las Animas . . .." "Report to Investigation Committee of the Arkansas River Compact Administration" at 20. Apparently forgetting these engineering reports, Colorado asserts that "Kansas did not present any engineering studies to support further investigation of the winter storage program." Brief in Support of Motion to Stay at 22.

[3]Figure 13 was the double mass curve of the annual adjusted streamflow of the Arkansas River at Canon City plotted against the annual streamflow at Las Animas. Figure 14 was the double mass curve of the adjusted streamflow at Canon City for the winter storage season plotted against the streamflow at Las Animas for the winter storage season. Ex. No. 47 at 20.

The winter water storage program was also specifically treated in Mr. Pope's report on October 5, 1985, entitled "Supplemental Report to the Arkansas River Compact Administration Regarding the Article VIII (H) Investigation of Alleged Violations of the Arkansas River Compact," Ex. No. 35 at 33.

The Investigation Committee met on October 8, 1985, and each state presented its supplemental report and discussed its conclusions. *See* Transcript of Proceedings, October 8, 1985, Ex. No. 37; *see also* Ex. No. 35; Ex. No. 36. The Committee again recognized that each state had reached different conclusions about the meaning of the mass diagram analyses and the causes of the declines in stateline flows. Accordingly, they decided to submit the original and supplemental reports separately to the Administration.

As a result of the impasse, the Arkansas River Compact Administration adopted its Resolution of October 8, 1985, terminating the investigation except in the limited area of mutual agreement. *See* Ex. No. 37 at 35-38. The area of "mutual agreement" resulted from Kansas' willingness to investigate all of its allegations, as well as Colorado's, and Colorado's willingness to investigate only its own. The Resolution of October 8, 1985, recited that Kansas wished to continue the administrative investigation of, *inter alia*, the "post-compact development and use of upstream storage reservoirs . . .." Colorado refused to continue the investigation.

Presentation of the Spronk Report to the Compact Administration

Attempting to suggest that Kansas acted in bad faith, Colorado first asserts that Kansas' failure to provide the Spronk report vitiated the administrative investigation that was conducted pursuant to Article VIII-H. The facts, however, show that the existence of the Spronk report was known to the Compact Administration before the administrative investigation began. Because of Colorado's rejection of Kansas' proposed method of analyzing the winter storage program and the Investigation Committee's choice of a different method of analysis, the Spronk report was excluded from consideration by the Compact Administration.

Glossing over the history, Colorado states that "[i]t was not until Kansas filed its March 8, 1986 brief that Colorado learned that Kansas intended to assert that the winter storage program had

adversely affected the regimen of the Arkansas River based on the Spronk report." Brief in Support of Motion to Stay at 24. Feigning surprise, Colorado states that it "immediately requested a copy of the report." *Id.* A year earlier, however, when the administrative investigation was initiated by Kansas on March 28, 1985, Mr. Spronk gave a presentation of his report to the Administration. David Pope, the Chief Engineer-Director of the Water Resources Division, Kansas State Board of Agriculture, explained that Kansas had done some "preliminary engineering studies" of the depletions to the inflow to John Martin Reservoir from the operation of the winter water storage program in Pueblo Reservoir. Transcript of Meeting of March 28, 1985, Ex. No. 28 at 71. He then asked Mr. Spronk "to make some comments regarding the hydrology that they have done in this particular regard." *Id.*

With the draft report in his hands, Mr. Spronk proceeded to explain his analysis to the Compact Administration.[4] *Id.* at 71-77. He began by reviewing the nature of the program, explaining that the reregulation of native waters in Pueblo Reservoir was part of the Fryingpan-Arkansas Project. Mr. Spronk made it clear that the analysis that his firm had done for Kansas "centered on the program's effect on winter inflows," as opposed to annual inflows, and qualified his conclusions by stating:

> A concern that we have not yet investigated fully is that the true effects of the program may, indeed, be masked since 1975 as a result, primarily, of trans-mountain diversions into the Arkansas River Basin. These trans-mountain diversions have resulted in return flows which have accrued to the flows of the Arkansas River. These flows have potentially

---

[4] A comparison of pages 66-70, labeled "Conclusions and Recommendations" in the draft report (Ex. No. 96), with pages 71-77 of the transcript of the special meeting of March 28, 1985, shows that Mr. Spronk was reading from the draft report. It is essentially verbatim.

offset or masked the total depletive effect of the winter water storage program.[5]

Transcript of Meeting of March 28, 1985, Ex. No. 28 at 75.

Mr. Spronk stated that the inflows to John Martin Reservoir during the winter storage season averaged 17,400 acre feet per year prior to the initiation of the program in 1976 and averaged 10,900 acre feet between 1976 and 1983. *Id.* at 75. He also stated his conclusion that the winter inflows to the conservation pool of John Martin had declined on the order of 4,600 to 6,500 acre feet per year since the program had been in effect. The same figures appear in the draft report. *Id.* at 76.

At the meeting on March 28, 1985, Colorado agreed to the investigation of the winter water storage program in Pueblo Reservoir and appointed an investigation committee. The Compact Administration's Investigation Committee held its first meeting on May 7, 1985, to discuss the scope of work for the investigation. Prior to the Committee meeting, the Colorado representative, Mr. McDonald, requested "a number of items by way of general background information for the investigation." The Spronk report was not requested. Minutes of the Investigation Committee, May 7, 1985, Ex. No. 29 at 2.

In regard to the operation of Pueblo Reservoir and the winter water storage program, Kansas proposed that the Investigation Committee:

1. Obtain all records and data showing historic diversions of winter flows by the participating entities in the winter water storage program.

2. Obtain and review all previous studies of the winter water storage program.

[5]Colorado has also refused to investigate the extent to which transmountain returns have and are masking ongoing depletions of native Arkansas River waters.

3. Quantify storage occurring during 1976-1985 in the winter water storage program.

4. Determine how and when water stored in the winter water storage program was used.

5. Analyze water flows of the Arkansas River at the Las Animas gage, both before and after 1976, determining amounts apportioned between program water and the conservation pool of John Martin Reservoir.

6. Ascertain whether any changes in the flow of the Arkansas River at Las Animas are the result of variances in the hydrology of the Basin.

7. Quantify the impact of the program on inflow to conservation storage and determine whether Article IV (D) has been violated.

8. Prepare report.

Attachment B, Scope of Work — Kansas Allegations, Ex. No. 29 at 4.

After disagreeing with Kansas' proposed scope of work in regard to postcompact well development, the Colorado representative disagreed with Kansas' proposed investigation of the operation of the winter storage program, which would have involved the Spronk report.[6] Instead, Colorado proposed to rewrite the scope of work for consideration at the Investigation Committee's second meeting on June 3, 1985. *See* Ex. No. 108. *See also* Affidavit of David L. Pope at 2.

On June 3, 1985, the Investigation Committee adopted a procedure to compile streamflow data and to construct a series of single and double mass diagrams of the flows of the Arkansas River and the Purgatoire River. The purpose of the mass analyses was to determine whether there had been declines in stateline flows or inflows to John

[6]Compare the "Purpose and Scope" of the Spronk report (Ex. No. 96 at 1-2) with the scope of work proposed by Kansas at the Investigation Committee meeting on May 7, 1985.

Martin Reservoir. This methodology was considerably broader and more generalized than the investigation Kansas had proposed and did not involve analyses of discrete causes of depletion. At this point the Spronk Report became irrelevant because of the broadened procedures. *See* Affidavit of David L. Pope at 3. The Committee agreed that if the diagrams indicated that depletions had in fact occurred, further studies would be undertaken to ascertain the causes. Minutes of Meeting of Investigation Committee, June 3, 1985, Ex. No. 30.

As has been explained previously, the mass diagrams showed substantial declines in postcompact stateline flows. After the mass diagrams were presented, however, considerable discussion ensued as to the causes of the declines. Because the states disagreed over the substance of the diagrams, it was finally decided that each would prepare a report explaining its interpretation of the data and the diagrams. *See* Minutes of Meeting of Investigation Committee, July 12, 1985, Ex. No. 32.

The end result was Colorado's refusal to undertake any further study or investigation of the operation of Pueblo Reservoir and the winter water storage program. *See* Resolution of October 8, 1985, Ex. No. 37. Had Kansas' proposed method of investigation been followed, the Spronk Report would have been useful to the Compact Administration's Investigation Committee. As it turned out, Colorado terminated the investigation before the winter storage program would have been studied individually as a cause of depletions to John Martin inflows.

Failure to present a written draft to the Committee or the Compact Administration did not vitiate the investigation. Instead, Colorado arbitrarily terminated the investigation without studying the winter storage program as a cause of depletions to John Martin inflows because it refused to recognize that man-made depletions had occurred. *See* Kansas' Response to Colorado's Motion to Stay, June 14, 1988, at 5-19. It is clear that the attempts by Kansas to investigate depletions caused by the winter storage program were blocked by

Colorado's actions. Colorado can not have it both ways. It can not control the course of the investigation by adopting a mode of analysis that excluded the Spronk report and subsequently complain that the investigation was ineffective because the Spronk report was not utilized.

The Submission of the Spronk Report

Continuing to make a cat's paw of the Spronk report, Colorado explains one side of the history to the Special Master. The chronology shows that the actions complained of by Colorado occurred one year after the termination of the investigation.

In September, 1985, counsel for Colorado agreed in a telephone conversation to provide counsel for Kansas with a copy of a groundwater study or "well inventory" by Mr. Ron Thaemert. Ex. No. 93. On March 23, 1986, a year after the Spronk report had been introduced to the Compact Administration, Colorado requested copies of two studies cited by Kansas in its reply brief of March 4, 1986, one of which was the Spronk report. Ex. No. 90. Though the Spronk report had been reviewed at the Compact Administration meeting on March 28, 1985, it was withheld at the time because it had not been completed.

At the status conference held by Judge McCree on August 20, 1986, Kansas submitted a proposed pretrial order that included a specific description of each of the studies that Kansas intended to undertake in preparation for the litigation. Ex. No. 101 at 4-5. Kansas also requested a similar description of the engineering studies that Colorado intended to undertake. Transcript of Status Conference, August 20, 1986, Ex. No. 102 at 33. Colorado refused, explaining that it was a defendant and did not know the nature of its studies at the time. *Id.* at 34-37, 44.

While Kansas also stated its desire to be informed of studies already undertaken, specifically the Thaemert "well inventory," the Special Master relied on a "gentlemen's agreement" to describe the

studies as soon as possible. *Id.* at 45. The Master specifically directed counsel for Colorado to write a letter regarding the groundwater study. Colorado agreed to this request. *Id.* at 47.

Shortly after the conference, Kansas decided to release the Spronk report, notwithstanding that the report had not been completed. Inadvertently, counsel released a study with the same title, *i.e.*, "Evaluation of the Arkansas River Winter Water Storage Program in Colorado," prepared by Mr. Spronk when he was with the firm of Simons, Li & Associates. *See* Ex. No. 93 at 1.

Subsequently, having not been provided with the well inventory, counsel decided to withhold the Spronk report until the two reports could be exchanged:

> We cannot release the Spronk report because the report exists only in draft form. However, if you are willing to release your well study, which Hal Simpson last referred to as a "well inventory," we would consider the possibility of exchanging reports sometime within the next six to eight weeks.

Ex. No. 22 at 1. Counsel had hoped that the Spronk report could be completed within the time stated.

Budgetary constraints made it impossible to complete the report. In any event, on June 3, 1987, counsel for Kansas tired of the cat and mouse game and released the report even though it had not been completed. At the same time, Kansas again requested the Colorado ground water study. Ex. No. 93.

Since then, Kansas has repeatedly asked for the Thaemert study, relying on the fact that it was initially promised in September, 1985. Finally, on November 11, 1988, Kansas formally requested a copy of the Thaemert report in its First Request to Produce Documents to the State of Colorado. On January 12, 1989, counsel for Kansas inquired about the status of Colorado's response to the request for production, asking specifically if the Thaemert report would be produced. Counsel for Colorado stated that it would be produced. On

January 17, 1989, Colorado formally responded to the request, withholding the report on the theory that it was done in anticipation of litigation.[7]

The Alleged Benefits of the 1980 Resolution Transit Loss Account

Colorado has also risen above the facts by divining that the Spronk report was withheld because it "concluded that there may have been some decline in inflow to John Martin Reservoir, but advised that Kansas might not benefit from raising the issue ...." Brief in Support of Motion to Stay at 24. While this supposition is irrelevant to its motion to stay, it nonetheless requires a response. Colorado confuses the facts by supplanting the issue of the winter water storage program in Pueblo Reservoir with a lengthy and misleading apologue about the transit loss account in John Martin Reservoir. *See* Brief in Support of Motion to Stay at 5-11.

Specifically, Colorado asserts that "[u]nder the 1980 operating plan, a portion of the water stored in John Martin Reservoir under the winter storage program has been used for the Kansas transit loss account" and that Kansas "did not want to risk renegotiation of the operating plan by suggesting modifications to the winter storage program." *Id.* at 25 and 2. The fact of the matter is that the "benefits" from the 1980 operating plan for John Martin Reservoir are part of Kansas' entitlement under the Compact. *Cf.*, Motion to Refer Motion for Leave to Amend Complaint, January 27, 1989. Kansas has also been advised that the 1980 Resolution is quite possibly *ultra vires*, *i.e.*, it is a legally ineffective amendment of Article V of the Arkansas River Compact. Its "renegotiation" has never been a concern of Kansas.

A brief explanation of Article V-E-3 is necessary to an understanding of the 1980 Resolution. Article V-E-3 provides that "[r]eleases of

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[7]Kansas will file a motion to compel production in due course.

river flow and of stored water to Colorado shall be measured by gaging stations at or near John Martin Dam *and the releases to which Kansas is entitled shall be satisfied by an equivalent in state-line flow."* (Emphasis added). The provision benefited Kansas in that it mandates that transit losses will be borne by Colorado, and it benefits Colorado in that Colorado can make the delivery with "equivalent . . . state-line flow." The effect is that Colorado can charge Kansas for its full demand without having to release the entire amount.

The provision as it relates to the 1980 Resolution has to be understood in the context of changing hydrologic conditions. When Article V was written, the reach of the Arkansas River between John Martin Reservoir and the stateline was a gaining stream, largely from surface water return flows and from ground water inflow or accretions. Because the river was a gaining river, Colorado was given the alternative of providing releases to Kansas in part from the accretions and returns. Thus, Colorado didn't have to release all of the molecules of water to which Kansas was entitled, plus a cushion for transit losses, but could deliver "equivalent" water.

By 1974, the flows of the Arkansas River had dropped off by approximately 70%. Due primarily to the proliferation of postcompact wells below John Martin Reservoir, the river was no longer a gaining river, but was often dry in different parts of the reach. Colorado's failure to regulate the river by the internal administration of Colorado law made it physically impossible for requested releases to reach the stateline. For example, between April 5-10, 1976, a release was made of 10,800 acre feet from John Martin at a rate of 1,000 cfs. The total loss down to the stateline was 2,373 acre feet. Colorado's 60% share was 6,480 acre feet. Colorado ditches diverted 6,505 acre feet. The flow at the stateline was 1,970 acre feet, resulting in a loss to Kansas of 54% of its entitlement. Although Colorado acknowledged its duty, it failed in its responsibility for delivery.

After numerous complaints and discussion of the matter by the Arkansas River Compact Administration, Colorado sought to solve the problem in part by issuing an administrative order pursuant to

Colorado law and Article V of the Arkansas River Compact requiring Colorado ditches to bypass releases of water for Kansas. When the ditches deliberately violated the order by diverting water during the initial release, Colorado filed a complaint and application for injunction. The complaint alleged that the actions of the defendants, the Amity Mutual Irrigation Company and the Buffalo Mutual Irrigation Company, had made it impossible for Colorado to abide by Article V-E-3 of the Compact. The complaint was authored by David Robbins, when he was an assistant attorney general in Colorado in the Natural Resources Section. *See* Ex. No. 103, Complaint, ***Colorado v. Amity Mutual Irrigation Company and Buffalo Mutual Irrigation Company***, Civil No. W-4764, Water Division No. 2, August 16, 1978. At trial, it was argued:

> In this matter, your Honor, the State is seeking an Order from the Court upholding its authority to issue orders to allow the State to meet its obligations under the Arkansas River Compact. We believe that reading of the Compact which is codified at 37-69-101 of the Colorado Revised Statutes shows that if Kansas makes a call for the water it is entitled to 400 cubic feet per second measured at the State line. The provisions which provide for that are, I believe, found in Article V, Sub E, Sub (3) of the Compact. That provision specifies that measurements for the flow for Kansas is to be measured at the State line, whereas Colorado's flow is measured just below John Martin Dam. It is also our opinion that the State water officials, that is to say, the State Engineer and Division Engineer and appropriate Water Commissioners, are the proper officials to enforce the obligations of the State of Colorado under the Compact . . .."

Transcript of Proceedings, Case No. W-4764, Ex. No. 104 at 120-21.

Because the case focused solely on two ditches in District 67, the water court ruled that the state engineer had acted discriminatorily.[8] Ex. No. 105, Findings of Fact at 8. The court found that there were approximately 5,000 surface decrees, nearly 5,000 well diverters, and almost 5,000 stock ponds in District 67 alone. Colorado did not seek to enjoin these uses. The court dismissed the complaint on equal protection grounds, further observing that "[i]t is clear that junior underground water decrees developed after the ratification of the Compact have materially depleted in usable quantity and availability the waters of the Arkansas River for use to water users in Colorado and Kansas." Ex. No. 105 at Section V.

The State of Colorado appealed. Because of concern over the implications of the district court's decision and the imminent possibility of interstate litigation, however, Colorado decided to abandon the appeal as it related to administration under the Compact. Colorado stated: "In the course of preparing [the] appeal, new evidence was discovered which established that the water commissioner's order to the ditches of water district 67 was based on an erroneous interpretation of the Arkansas River Compact." Ex. No. 106, Opening Brief, Colorado Supreme Court No. 81 SA 467 at 2. The brief was authored by Dennis Montgomery, who had become an assistant attorney general for Colorado in the Natural Resources Section. Sensitive to the political problem, the Colorado Supreme Court agreed that the water judge "improperly took judicial notice that

[8]Amity raised twelve affirmative defenses, three of which were critical to the district court's ultimate ruling: 1) that the duty to deliver water to Kansas should be imposed equally on all diverters in the Arkansas River Basin; 2) that Colorado itself had caused the problem by: a) not enforcing water rights decrees, particularly ground water rights, under the prior appropriation doctrine; b) adopting inaccurate and artificial transit and evaporation losses; c) allowing out-of-priority storage in Pueblo Reservoir; d) permitting the unregulated construction of stock ponds; e) failing to adopt rules and regulations respecting ground water uses; and f) failing to make regulations for the distribution of the releases under the Compact; and 3) that Colorado itself had destroyed the regimen of the river. The district court agreed with Amity.

stock ponds and wells developed after ratification of the Arkansas River Compact have materially depleted the waters of the Arkansas River." *Id.* at i; Ex. No. 107, Opinion at fn. 3. Nonetheless, the Supreme Court affirmed the district court's judgment.

With the transit loss problems in Colorado and the convergence of other factors, such as the desire to create a permanent pool in John Martin Reservoir for fish, wildlife, and recreational purposes, the Compact Administration recognized the possible benefits of changes in John Martin operations. The Administration's discussions culminated in the Resolution of April 24, 1980, which created storage accounts in John Martin for Kansas, for the ditches in Colorado Water District 67, and for other Colorado ditches. Paragraph III(D) created the "Kansas Transit Loss Account." The account was supplied by waters obtained from Amity Mutual Irrigation Company, by an agreement allowing Amity to transfer part of its storage water decree to John Martin Reservoir. Amity agreed to supply 35% of the transferred water that it otherwise could have stored in the Great Plains Reservoir system.[9]

The transit loss account created by the 1980 Resolution is a misnomer. Article V-E-3 requires that Kansas' entitlement be measured at the stateline. The responsibility for transit losses rests squarely on Colorado. The transit loss account simply helps Colorado make its required deliveries, which does not embarrass Kansas. The

[9]The Great Plains system was extremely inefficient, with most of the water stored being lost to evaporation. At the Compact Administration meeting on May 5, 1976, Bill Hund of the Amity Canal stated that they had done a thirty-six year study on the Great Plains reservoirs and concluded that they received fifty-one percent of the water out of the reservoirs that was diverted into them. *See* Transcript of Proceedings, Arkansas River Compact Administration, May 5, 1976 at 23. Amity actually received a significant net gain by its agreement to contribute 35% of its water to the Kansas transit loss account.

alleged "benefit" to Kansas is something Kansas is entitled to under the Compact.[10] Colorado is simply wrong in deciphering that Kansas wilfully withheld the Spronk report because it jeopardized Kansas' "benefits" under the 1980 operating plan. The theory is cute, but it is nonsense.

Review of the Winter Water Storage Decree

Colorado argues that Kansas' refusal in November, 1987, to review the Colorado Water Court's winter storage decree "created an impasse which has prevented the Compact Administration from carrying out a review of the winter storage program." The administrative investigation of the winter storage program under Article VIII-H, however, was terminated by Colorado on October 8, 1985.[11]

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[10]There are only two references in the 1980 Resolution which refer to the winter storage program in Pueblo Reservoir. Paragraphs III(B) and III(C) establish storage accounts in John Martin Reservoir for the Fort Lyon Canal Company and Las Animas Consolidated Canal Company. The water to be stored in these accounts is delivered to John Martin "under an approved Pueblo winter storage plan . . . the delivery cannot include water that otherwise would have accumulated in conservation storage." In its brief, Colorado suggests that all "other water" stored in John Martin Reservoir in accordance with Paragraph III of the 1980 Resolution is somehow tied to or associated with the winter storage program. However, the account established for the Amity Canal Company makes no reference to "an approved Pueblo winter storage plan" as do the accounts for Fort Lyon and Las Animas.

[11]Colorado predicates its argument on Kansas' "legal position on the 1951 Resolution," *i.e.*, that it requires that the Compact Administration approve any plan of reregulation of native waters. The legal position, however, has nothing to do with whether Kansas sought an administrative investigation of whether the storage program has depleted inflows into John Martin. That position is treated in Kansas' Response to Colorado's Motion for Partial Summary Judgment.

ARGUMENT

POINT I

A STATE IS REQUIRED TO EXHAUST ITS ADMINISTRATIVE REMEDIES ONLY ONCE.

The record shows that Kansas has made a reasonable, good faith effort to exhaust administrative remedies before the Arkansas River Compact Administration with respect to depletions caused by the winter water storage program. *See* pp. 5-9, above; Kansas' Response to Motion to Stay, June 14, 1988, at 6-19. That effort was frustrated by the political structure of the Arkansas River Compact Administration, which allowed Colorado to exercise its veto power to prevent an investigation of the allegations in the March 28, 1985 Resolution. Accordingly, further efforts at exhaustion would be futile.

The futility of administrative proceedings is a recognized exception to the exhaustion requirement. As one commentator put it: "To insist, as a prerequisite to judicial relief, that those aggrieved first pass through the very procedures that are discriminatory would be to require an exercise in futility." Bernard Schwartz, *Administrative Law* § 8.31 at 505-506 (2nd ed. 1984). Kansas agrees that the policy considerations for exhaustion which have been articulated by Colorado are correct. But these policies can be realized only if the administrative forum is structured in a manner which allows their realization.

The cases are clear. In *Camenisch v. University of Texas*, 616 F.2d 127, 134 (5th Cir. 1980), the Court held that "[i]t is well-settled that where there is no adequate administrative procedure available, the exhaustion doctrine does not apply. *Bossier Parish School Board v. Lemon*, 370 F.2d 847, 852 (5th Cir. 1967), *cert. denied* 388 U.S. 911, 87 S.Ct. 2116, 18 L.Ed. 2d 1350 (1967)." Because the inadequacy of the Arkansas River Compact Administration's procedures are the problem, further invocation of those procedures is both pointless and

injurious to Kansas. As the court held in *American Federation of Government Employees v. Acree*, 475 F.2d 1289 (D.C. Cir. 1973):

> But there are cases where the customary rationales for the exhaustion of administrative remedies doctrine — avoidance of unnecessary judicial intervention and the need for full, unhampered exercise of agency expertise on a well developed factual record of its own making, *see, e. g.*, McKart v. United States, 395 U.S. 185, 193-195, 89 S.Ct. 1657, 23 L.Ed.2d 194 (1969) — do not apply and the doctrine's application thus become pointless. In some cases the doctrine is no more than "an exercise in futility," *see* Lodge 1858, American Federation of Government Employees v. Paine, 141 U.S.App.D.C. 152, 166, 436 F.2d 882, 896 (1970), particularly where it is clear beyond doubt that the relevant administrative agency will not grant the relief in question. *See* Montana National Bank of Billings v. Yellowstone County, 276 U.S. 499, 48 S.Ct 331, 72 L.Ed. 673 (1928).

475 F.2d at 1292. Kansas' experience before the Compact Administration has resulted only in Colorado's refusal to participate.

Colorado's citation of legal authority is based on the erroneous premise that Kansas provoked an impasse in the Article VIII-H investigation by failing to "reasonably" pursue the 1985 investigation. Accordingly, the cases are inapposite. The facts show that Kansas' efforts to obtain an Administration investigation of the five issues in the March 28, 1985 Resolution were repeatedly frustrated. *See* pp. 5-9, above; Kansas' Response to Motion to Stay, June 14, 1988, at 6-19 Brief. For example, Colorado cites *National Conservative Political Action Comm. v. Federal Election Comm'n.*, 626 F.2d 953, 957 n.8 (D.C. Cir. 1980). In that case, however, the court was addressing a circumstance in which the claimant had refused to appear before the administrative agency. As the court noted "... the first time the Commission was confronted with appellants' objections to the Commission's regulation was in the district court." 626 F.2d at 957. Similarly, in *Seafarers Intern. v. United States Coast Guard*, 736

F.2d 19, 26 n.11 (2nd Cir. 1984), the Court observed that "[e]xhaustion analysis is relevant to our holding on justiciability because Seafarers' failure to exhaust or even engage in administrative review has left the factual record so undeveloped that the case is not ripe for judicial review ...." Both cases address the situation in which administrative review was evaded. In this case, administrative review was not evaded by Kansas, but rather was frustrated by Colorado.

Colorado also cites two cases for the proposition that claims not presented to an administrative agency may not be made for the first time to a reviewing court. *Plaquemines Port, Harbor and Terminal Dist. v. Federal Maritime Comm'n.*, 838 F.2d 536, 551 (D.C. Cir. 1988); *Washington Ass'n. for Television & Children v. FCC*, 712 F.2d 677, 680 (D.C. Cir. 1983). Neither is precedent for the circumstances presented here, where Kansas made a clear effort to obtain review of the winter storage program by the Compact Administration prior to filing suit. Ironically, Colorado has cited *Bethlehem Steel Corp. v. E.P.A.*, 669 F.2d 903 (3rd Cir. 1982). That case held that "the doctrine of administrative exhaustion should be applied with a regard for the particular administrative scheme at issue." 669 F.2d at 906. The administrative scheme at issue here has resulted in the necessity of an original action.

As in *Texas v. New Mexico*, 462 U.S. 554 (1983), the Court's original jurisdiction in this case was invoked by Kansas only when administrative procedures provided by Compact proved unworkable. As the Special Master concluded in his opinion of October 21, 1988, the Court has "intimated that 'fundamental structural considerations,' such as an interstate compact that accords each signatory state the power to veto authoritative commission action, may abbreviate inquiry into the question of whether an available remedy exists at the administrative level." It is clear that further analysis of the winter storage program in Pueblo Reservoir by the Compact Administration is futile.

POINT II

IT WOULD BE ANALYTICALLY IMPRACTICAL TO SEPARATE DEPLETIONS OF ARKANSAS RIVER FLOWS CAUSED BY THE WINTER WATER STORAGE PROGRAM FROM THE ISSUES SET FOR TRIAL.

Quite aside from the law and the fact that Kansas has exhausted its administrative remedies with respect to the winter water storage program, the impact of the program on streamflow at the stateline cannot be evaluated accurately in isolation from the consideration of other effects on stateline flows. Hydrologically, individual factors contributing to decreased stateline flows cannot be analyzed separately. Instead, the analysis of one cause requires the simultaneous consideration of the interactions among other causes.

Institutional arrangements and the stream system hydrology must be evaluated together to be conclusive about causes of depletion. Institutional arrangements, such as the winter water storage program, combine hydrodynamically with other institutional actions, such as pumping from alluvial wells along the Arkansas River, to produce a net hydrologic result. In this case the result is reduced stateline flows. Accordingly, the impact of the winter water storage program can be identified only by considering that program within the context of all causes of depletion in the overall hydrologic system, both natural and man-made.

The institutional system in the Arkansas River Basin is comprised of arrangements that govern the operation of surface water reservoirs, the direct diversion of surface water, and the pumping of groundwater. The hydrologic system consists of the surface water and groundwater subsystems. Relationships exist within and between the institutional and hydrologic systems. Examples of the relationships within the hydrologic system include groundwater returns to the Arkansas River which contribute to streamflow and streamflow which provides groundwater recharge. Interaction between the institutional and hydrologic systems include groundwater pumping which

affects streamflow, which affects surface diversions. In turn, surface diversions affect groundwater pumping.

The winter water storage program produces effects that are the result of such relationships. The program is designed to reduce winter diversions for irrigation and to increase storage in the program reservoirs. It leads to five results: The decrease of storage in non-program accounts in John Martin Reservoir; the increase of the summer supply for Colorado from the program reservoirs; the decrease of the summer supply for Kansas and Colorado from non-program accounts in John Martin Reservoir; the increase of summer pumping in Colorado, owing to reduced winter storage in John Martin Reservoir; and decreases of summer pumping, owing to the increased winter storage in the program reservoirs. These institutional and hydrologic actions and reactions combine to produce a particular effect on streamflow at the stateline. The effect can be identified only by considering all of the relationships within and among the systems.

The State of Kansas is pursuing investigations that address these relationships. The issues are being addressed through the development and use of two types of models. The first is a descriptive model for the analysis of hydrologic data. This model is based on water budgets for various components of the hydrologic system. The second is a prescriptive model to simulate the relationships within and between the hydrologic and institutional systems. This model is based on both the hydrodynamic relations that describe the hydrologic system and on the administrative rules that comprise the institutional system. These models are being used conjunctively to identify and quantify the causes and affects of the depletion of streamflow at the stateline. Both models require that all of the institutional actions that potentially effect state-line flow be considered simultaneously. Accordingly, the winter water storage program must be included in the analysis that will be presented to the Master. For the Special Master to receive this factual evidence, of necessity,

yet preclude it from the legal dimension of his opinion, as Colorado proposes, would not be feasible.

CONCLUSION

In deciding this motion we ask the Special Master to consider the Greek saying that those whom the Gods wish to destroy they first make mad. In our circumstance, those whom the Gods wish to destroy they first require to perpetually exhaust administrative remedies before the Arkansas River Compact Administration.

Respectfully submitted,

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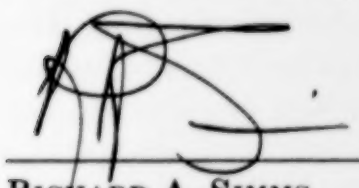

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No. 105 Original

In The Supreme Court

Of The United States

STATE OF KANSAS
Plaintiff,

v.

STATE OF COLORADO
Defendant.

CERTIFICATE OF SERVICE

I, Richard A. Simms, hereby certify that I caused to be mailed three copies of the foregoing Kansas' Response to Colorado's Second Motion to Stay to be served by first-class mail on the following this 27th day of January, 1989:

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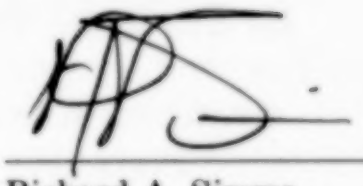

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Supreme Court, U.S.
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No. 105, Original

IN THE
Supreme Court of the United States
October Term, 1985

Before The Honorable Arthur L. Littleworth,
Special Master

STATE OF KANSAS
Plaintiff,

v.

STATE OF COLORADO
Defendant,

and

UNITED STATES OF AMERICA
Defendant-Intervenor.

FIRST AMENDED COMPLAINT

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No. 105, Original

IN THE

Supreme Court of the United States

October Term, 1985

Before The Honorable Arthur L. Littleworth,
Special Master

STATE OF KANSAS
Plaintiff,

v.

STATE OF COLORADO
Defendant,

and

UNITED STATES OF AMERICA
Defendant-Intervenor.

FIRST AMENDED COMPLAINT

The State of Kansas, by its Attorney General, the Honorable Robert T. Stephan, brings this suit against the Defendant, State of Colorado, and for its cause of action states:

1. The jurisdiction of the Court is invoked under Article III, Section 2, Clause 2 of the Constitution of the United States and Paragraph (a), Section 1251, Title 28 of the United States Code.

2. The Arkansas River is an interstate river which rises near Leadville, Colorado and flows south to Salida, Colorado, east through Canon City and Pueblo, and across southeastern Colorado into the State of Kansas.

3. In order to resolve existing and future controversies and to divide and equitably apportion the water of the Arkansas River, Congress consented to the negotiation of a compact by the states of Colorado and Kansas. Act of April 19, 1945, 59 Stat. 53. Subsequently, the Arkansas River Compact was ratified by the State of Colorado by the

Act of February 19, 1949, Colo. Rev. Stat. 1963, § 149-9-1; the State of Kansas ratified the Compact by the Act of March 7, 1949, Kansas Gen. Stat. Ann. 1964, § 82a-520. The Compact was approved and enacted into federal law by the Act of Congress of May 31, 1949, 63 Stat. 145. A copy of the Arkansas River Compact was attached as Appendix A to the original Complaint in this action.

4. The principal purpose of the Arkansas River Compact was to "[e]quitably divide and apportion ... the waters of the Arkansas River and their utilization as well as the benefits arising from the construction, operation and maintenance by the United States of John Martin Reservoir Project for water conservation purposes." 63 Stat. 145, 145, art. I.

5. While expressly recognizing the possibility of offsetting postcompact development of the waters of the Arkansas River by new regulation or increased efficiency, the Compact mandates "that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas ... by such future development or construction." 63 Stat. 145, 147, art. IV(D).

6. The Compact provides that "Colorado shall administer the decreed rights of water users in Colorado Water District 67 as against each other and as against all rights now or hereafter decreed to water users diverting upsteam from John Martin Dam on the basis of relative priorities...." 63 Stat. 145, 148, art. V(F).

7. Through the actions of its officers, agents and political subdivisions, the State of Colorado and its water users have materially depleted the usable and available stateline flows of the Arkansas River since the adoption of the Compact.

8. In spite of its duties and obligations under the Compact, since 1949 the State of Colorado has allowed and permitted substantial increases in the diversion and use in Colorado of the surface and hydrologically related ground

waters of the Arkansas River, without the concomitant regulatory or conservation measures that the Compact requires to protect the states against material depletions in usable stateline flows.

9. The lack of effective administrative practices in Colorado has encouraged rather than retarded the development of postcompact depletions of the waters of the Arkansas River Basin and has resulted in ongoing, material depletions of the usable flows of the Arkansas River and substantial and irreparable injury to Kansas water users.

10. For more than twenty years, the State of Colorado has investigated and known the impact of the ground water appropriations in the Arkansas River Basin in Colorado. Approximately 150,000 acre feet per year of ground water related to the Arkansas River has been appropriated in Colorado since 1949, and the State of Colorado has intentionally disregarded the findings of its investigations to the effect that such appropriations directly and materially reduce the usable flow and availability of the Arkansas River in Colorado and Kansas. By its acquiescence in the postcompact proliferation of ground water diversions and its failure to administer the priorities of postcompact ground water diversions with existing surface diversions, Colorado has breached and continues to breach its obligations and responsibilities under the Arkansas River Compact.

11. Since the adoption of the Compact, the State of Colorado has attempted to unilaterally impede the bilateral action of the Compact Administration intended to protect Kansas' Compact apportionment and has failed to apply and administer its internal laws in order to meet its obligations under the Compact.

12. Pursuant to Article VIII(H), the Arkansas River Compact Administration has conducted an investigation of alleged Compact violations. The State of Colorado, however, through its Compact Commissioner, has rejected and continues to reject the State of Kansas' requests to investigate the impact on the Arkansas River of: 1) Colorado's

substantial, postcompact ground water depletions of surface flows at the stateline; 2) the failure of Colorado to administer ground water priorities against surface priorities; 3) Colorado's artificially transferring water from the storage pool in Trinidad Reservoir to the sediment pool and then refilling the storage pool to the detriment of downstream users; 4) the consequences of future increases in the consumption of Colorado's transmountain return flows; and 5) Colorado's unilateral rejection of the Arkansas River Compact Administration's Resolution of July 24, 1951, requiring that any reregulation of the native water of the Arkansas River be approved by the Compact Administration. Additionally, the State of Colorado refuses to enjoin its postcompact ground water appropriations and resulting surface depletions during the pendency of investigation of the effects of such appropriations, in spite of the irrefutable fact that those appropriations materially deplete the usable and available flows of the Arkansas River. Accordingly, the State of Colorado has used and will continue to use the pending administrative investigation as the basis for prolonging the substantial and irreparable injury to the State of Kansas by wrongfully depriving the State of Kansas and its citizens of the waters of the Arkansas River to which they are entitled under the Compact.

13. The State of Colorado has failed and continues to fail to make deliveries of releases to which Kansas is entitled from John Martin Reservoir by an equivalent in stateline flow, as required by Article V(E)3 of the Compact, and in violation of Articles V(E)4 and V(H)2.

14. Grave and irreparable injury to the State of Kansas and its citizens who were entitled to receive and use the water apportioned to them by the Arkansas River Compact has been caused by the acts and conduct of the State of Colorado, its officers, citizens, and political subdivisions in failing, neglecting, and refusing to deliver water to Kansas in the usable and available quantities apportioned to it by the Compact.

15. Grave and irreparable injury will be suffered in the future by the State of Kansas and its citizens unless relief is afforded by this Court to prevent the State of Colorado, its officers, citizens, and political subdivisions from using and withholding water which Kansas is entitled to and which Colorado has heretofore agreed to deliver pursuant to the terms and provisions of the Arkansas River Compact.

16. The State of Kansas has sustained damages as follows:

(a) General damages arising from breach of the Arkansas River Compact by the State of Colorado, consisting of the value of Kansas' apportioned share of the Arkansas River lost to Kansas as a result of Colorado's depletions of the Arkansas River resulting from its violations of the Arkansas River Compact in an amount to be proved at trial.

(b) Special damages arising from breach of the Arkansas River Compact by the State of Colorado consisting of depletions of the Ogallala aquifer, a non-renewable resource, in the State of Kansas, resulting from Colorado's violations of the Arkansas River Compact in an amount to be proved at trial.

17. The State of Kansas has no effective remedy to enforce its rights under the Arkansas River Compact against the State of Colorado other than through the exercise of original jurisdiction in this case.

WHEREFORE, the State of Kansas respectfully prays that the Court issue its decree commanding the State of Colorado, its officers, citizens, and political subdivisions to deliver the waters of the Arkansas River in accordance with the provisions of the Arkansas River Compact and providing for such other and further relief as the Court may deem appropriate; and WHEREFORE, the State of Kansas prays that the Court award all general and special damages resulting from violations of the Arkansas River Compact by the State of Colorado, and for all other relief that the Court deems just and proper.

Respectfully submitted,

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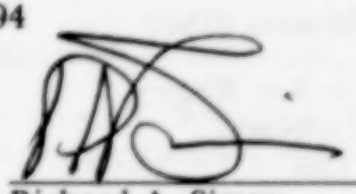

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Supreme Court, U.S.
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No. 105, Original

IN THE
Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,
Plaintiff,

v.

STATE OF COLORADO,
Defendant,

and

UNITED STATES OF AMERICA,
Defendant-Intervenor.

COLORADO'S ANSWER TO THE FIRST AMENDED COMPLAINT AND COUNTERCLAIM

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COLORADO'S ANSWER TO THE FIRST AMENDED COMPLAINT AND COUNTERCLAIM

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CONSTITUTION:

U.S. Const., Art. III, §2, Cl. 2 5

ANSWER

Defendant, the State of Colorado, for its answer to the First Amended Complaint filed in the above-captioned action by Plaintiff, the State of Kansas, states:

1. Colorado admits the Court has jurisdiction under the allegations in paragraph 1 of the First Amended Complaint. Colorado denies that this is an appropriate case for the Court to exercise such jurisdiction because Kansas has failed to exhaust its administrative remedies under Article VIII of the Arkansas River Compact.

2. Colorado admits the allegations in paragraph 2 of the First Amended Complaint.

3. Colorado admits the allegations in paragraph 3 of the First Amended Complaint.

4. Colorado admits that one of two major purposes of the Arkansas River Compact is quoted in paragraph 4 of the First Amended Complaint. Colorado denies the allegations of paragraph 4 insofar as they assert that the purpose set forth in Article I-B of the Compact is the "principal" purpose of the Arkansas River Compact.

5. Colorado admits that a portion of Article IV-D of the Compact is quoted in paragraph 5 of the First Amended Complaint. Colorado denies the allegations of paragraph 5 insofar as they assert Kansas' interpretation of Article IV-D.

6. Colorado admits that a portion of the first sentence of Article V-F of the Arkansas River Compact is quoted in paragraph 6 of the First Amended Complaint. The first sentence of Article V-F in its entirety reads as follows:

> In the event the Administration finds that within a period of fourteen (14) days the water in the conservation pool will be or is liable to be exhausted, the Administration shall forthwith notify the State Engineer of Colorado, or his duly authorized representative, that commencing upon a day certain within said fourteen (14) day period, unless a change of conditions justifies

cancellation or modification of such notice, Colorado shall administer the decreed rights of water users in Colorado Water District 67 as against each other and as against all rights now or hereafter decreed to water users diverting upstream from John Martin Dam on the basis of relative priorities in the same manner in which their respective priority rights were administered by Colorado before John Martin Reservoir began to operate and as though John Martin Dam had not been constructed.

Colorado affirmatively alleges that the Arkansas River Compact Administration by resolution in 1980 adopted an operating plan for John Martin Reservoir which modifies the method by which the Administration finds that the water in the conservation pool is exhausted for the purposes of Article V-F.

7. Colorado denies the allegations in paragraph 7 of the First Amended Complaint.

8. Colorado denies the allegations in paragraph 8 of the First Amended Complaint.

9. Colorado denies the allegations in paragraph 9 of the First Amended Complaint.

10. Colorado admits that for more than twenty years its agencies or officials have investigated ground water appropriations in the Arkansas River Basin in Colorado. Colorado denies the remaining allegations of paragraph 10 of the First Amended Complaint.

11. Colorado denies the allegations in paragraph 11 of the First Amended Complaint.

12. Colorado admits that the Arkansas River Compact Administration was in the process of conducting an investigation of alleged Compact violations pursuant to Article VIII-H of the Arkansas River Compact at the time Kansas commenced this proceeding on December 16, 1985, and that Colorado refused to enjoin all post-compact ground water appropriations in Colorado during the pendency of the investigation. Colorado admits that the Colorado

representatives to the Arkansas River Compact Administration rejected requests by the Kansas representatives to investigate the consequences of possible future increases in the consumption of Colorado's "transmountain" return flows. Colorado denies the remaining allegations of paragraph 12 of the First Amended Complaint.

13. Colorado denies the allegations in paragraph 13 of the First Amended Complaint.

14. Colorado denies the allegations in paragraph 14 of the First Amended Complaint.

15. Colorado denies the allegations in paragraph 15 of the First Amended Complaint.

16. Colorado denies the allegations in paragraph 16 of the First Amended Complaint.

17. Colorado denies the allegations in paragraph 17 of the First Amended Complaint.

AFFIRMATIVE DEFENSES

1. Kansas failed to exhaust its administrative remedies under Article VIII of the Arkansas River Compact.

2. Kansas' claims against Colorado are barred by accord and satisfaction, failure to mitigate damages, laches, estoppel, waiver, statute of limitations, or the doctrine of unclean hands.

3. To the extent post-compact developments were beyond the control of the State of Colorado, Colorado is not liable for those acts.

4. Article V-E(5) of the Arkansas River Compact provides there shall be no allowance or accumulation of credits or debits for or against either state.

5. With regard to Kansas' claim that Colorado and its water users have materially depleted the usable and available stateline flows of the Arkansas River since the adoption of the Compact to the injury of

water users in Kansas under the Compact, Colorado asserts that irrigation in the Arkansas River basin in Colorado has declined since the adoption of the Compact and that acreage under irrigation in western Kansas has increased at least five-fold in the same period, from approximately 65,000 acres in 1948 to 350,000 acres in 1980. Kansas seeks to have this Court rewrite the Arkansas River Compact to impose a new stateline delivery obligation on Colorado so as to maintain a post-compact well economy in western Kansas, all at the expense of Colorado water users, contrary to the express terms of the Compact.

6. Waters brought into the Arkansas River basin from other river basins are not apportioned to Kansas under the Arkansas River Compact and Kansas has no claim or right to such waters.

7. In 1980, the Arkansas River Compact Administration approved an operating plan for John Martin Reservoir pursuant to which water stored in the conservation pool of the reservoir is transferred into separate storage accounts for Kansas and ditches in Colorado Water District 67 at agreed upon rates and is apportioned into the accounts in agreed upon percentages. Based upon a series of agreements among Colorado users, after water stored in the conservation pool is fully transferred to the separate storage accounts, but not necessarily released from the reservoir, Colorado reverts to administration of decreed priorities and the decreed rights of water users in Colorado Water District 67 are administered as against rights decreed to water users diverting upstream from John Martin Dam on the basis of relative priorities in the same manner as though John Martin Dam had not been constructed. The Colorado representatives approved the operating plan in 1980 and have allowed the operating plan to remain in effect from year-to-year thereafter, to the substantial benefit of Kansas water users, based upon the aforesaid agreements among Colorado water users to determine when a "call" by ditches in Colorado Water District 67 will be enforced above John Martin Reservoir. Those agreements were in turn based on an agreement to permit storage of historical direct-flow winter diversions upstream from John Martin Reservoir. Kansas has

accepted the benefits of the 1980 operating plan and agreed to its terms with knowledge of the agreements among Colorado water users and with knowledge that the 1980 operating plan would change the regimen of the Arkansas River. Therefore, by having accepted the benefits of the 1980 operating plan, Kansas is barred from asserting that any reregulation of the native waters of the Arkansas River be approved by the Compact Administration based upon the Administration's Resolution of July 24, 1951.

8. With regard to Kansas' allegation that Colorado, through its Compact "Commissioner", has rejected and continues to reject Kansas' requests to investigate Colorado's "unilateral rejection" of the Arkansas River Compact Administration's resolution of July 24, 1951, Colorado denies that the Resolution has any binding effect on Colorado. In the alternative, the Resolution was amended by the Administration on January 4, 1982. Further, Kansas failed to raise an objection to the winter storage program in Pueblo Reservoir for six years after it began operation in 1975 with the full knowledge of Kansas and the Administration.

COUNTERCLAIM

Defendant, the State of Colorado, by its Attorney General, asserts the following counterclaim against Plaintiff, the State of Kansas:

1. The Court has jurisdiction of this counterclaim under Article III, Section 2, Clause 2 of the Constitution of the United States, and Paragraph (a), Subsection (1), Section 1251, Title 28 of the United States Code.

2. The Arkansas River is an interstate stream which rises in the Rocky Mountains near Leadville, Colorado, then flows southeasterly to Salida, Colorado, then east through Canon City to Pueblo, Colorado, then across the plains of eastern Colorado into the State of Kansas.

3. In order to settle existing disputes and to remove causes of future controversy concerning the waters of the Arkansas River and

to equitably divide and apportion between the States of Colorado and Kansas the waters of the Arkansas River, as well as the benefits arising from the construction, operation, and maintenance of John Martin Reservoir for water conservation purposes, the States of Colorado and Kansas ratified the Arkansas River Compact, which Compact was approved by the United States Congress by Act of May 31, 1949, 63 Stat. 145.

4. Article V-E(2) of the Arkansas River Compact provides: "Water released upon concurrent or separate demands shall be applied promptly to beneficial use unless storage thereof downstream [from John Martin Reservoir] is authorized by the [Arkansas River Compact] Administration."

5. On information and belief, the state officials charged with administration of water rights in Kansas have allowed water released from John Martin Reservoir upon demand by Kansas under Article V of the Arkansas River Compact to be stored downstream in Lake McKinney in Kansas rather than being applied promptly to beneficial use, in violation of the provisions of Article V-E(2) of the Compact.

6. Subsequent to the approval of the Arkansas River Compact by the United States Congress in 1949, state officials charged with the administration of water rights in Kansas have allowed the construction of wells and have permitted ground water appropriations in Kansas that have materially depleted the usable quantity or availability for use to the surface water users in Kansas under the Compact. Those depletions caused Kansas to make additional demands for releases of water stored in John Martin Reservoir pursuant to the Compact to the detriment of water users in Colorado.

7. Irreparable injury to the State of Colorado and water users in Colorado under the Compact has been caused by the acts and conduct of the State of Kansas, its officers, and citizens in permitting the use of the waters of the Arkansas River in violation of the terms of the Compact.

WHEREFORE, having fully answered and having asserted its affirmative defenses and counterclaim, Colorado prays that the Court grant judgment for Colorado and against Kansas on the claims of Kansas, that the Court issue its decree compelling the State of Kansas, its officers, and citizens to comply with the provisions of the Arkansas River Compact, that Colorado have and recover its reasonable costs, and for such other and further relief as the Court may deem proper under the circumstances.

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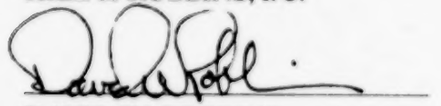

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No. 105, ORIGINAL

In The

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October Term, 1985

STATE OF KANSAS,

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STATE OF COLORADO,

Defendant,

and

UNITED STATES OF AMERICA,

Defendant-Intervenor.

ARTHUR L. LITTLEWORTH, Special Master

REPORT

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ABBREVIATIONS AND GLOSSARY

1.	Reporter's Transcript	RT Vol. at ___
2.	Exhibits of Parties, and Joint Exhibits	Kan. Exh. ___ Colo. Exh. ___ U.S. Exh. ___ Jt. Exh. ___
3.	Post-Trial Briefs	
	(a) Kansas' Post-Trial Opening Brief	Kan. Opening Br. at ___
	(b) Colorado's Closing Brief re Kansas' Well Claim	Colo. Closing Well Br. at ___
	(c) Colorado's Closing Brief re Kansas' Winter Water Storage Claim	Colo. Closing WWSP Br. at ___
	(d) Amended Trial Brief of the United States on Kansas' Winter Water Storage Program Claim	U.S. WWSP Br. at ___
	(e) Kansas' Post-Trial Answer Brief	Kan. Answer Br. at ___
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	(g) Amended Response Brief of the United States on the Kansas Winter Water Storage Claim	U.S. Response Br. at ___
	(h) Kansas' Post-Trial Reply Brief.	Kan. Reply Br. at ___
	(i) Colorado's Reply Brief	Colo. Reply Br. at ___
	(j) Reply Brief of the United States on the Kansas Winter Water Storage Claim	U.S. Reply Br. at ___
	(k) Colorado's Memorandum re Matters to be Raised at Oral Argument	Colo. Oral Argument Memorandum at ___
4.	Acre-foot	AF, a volume of water one foot deep over one acre in area; equal to 325,900 gallons.
5.	Cubic feet per second	cfs, a rate of flow equal to 7.48 gallons per second, or 1.983 acre-feet per day.
6.	Evapotranspiration	ET, loss of water from soil by evaporation and by transpiration from plants growing thereon.

ABBREVIATIONS AND GLOSSARY – Continued

7.	Gallons per minute	gpm
8.	Hydraulic conductivity	The volumetric rate at which water will pass through a unit cross-sectional area of an aquifer under a given hydraulic gradient.
9.	Kilowatts (1,000 W)	kW
10.	Kilowatt hours	kWh
11.	Million acre-feet	MAF
12.	Potential evapotranspiration	PET
13.	Saturated zone	Portion of the geologic profile below the groundwater table, in which the pores or voids between the soil particles are filled with water.
14.	Specific yield	A measurement of the volume of water that will drain by gravity from a unit of saturated soil.

ABBREVIATIONS AND GLOSSARY – Continued

15.	Transmissivity	A quantitative measurement of the groundwater that will move through the full saturated thickness of the aquifer. Calculated as the hydraulic conductivity of the aquifer times the saturated thickness under a given hydraulic gradient.
16.	Unsaturated zone	Portion of the geologic profile above the groundwater table, or the saturated zone. The pores or voids between the soil particles may have both air and water in them.
17.	United States Geological Survey	USGS
18.	Winter Water Storage Program	WWSP

REPORT - PART I

PRIMARY REPORT ON LIABILITY ISSUES

SECTION I

INTRODUCTION

Like many rivers in the West, the upper reach of the Arkansas has been beset by decades of controversy. Twice before in this century, the States of Kansas and Colorado have litigated in the Supreme Court.[1] In the early years numerous suits were also filed among private water users in the two states.[2] Yet none of these legal actions successfully settled the basic issue of how the Arkansas River should be apportioned between the two states. Nor did the 1949 Arkansas River Compact achieve the lasting peace sought by those who negotiated that agreement, even though it was approved by the legislatures and governors of both states, as well as by the Congress of the United States.[3]

The settlement of Kansas, which was admitted to the Union in 1861, commenced before that in Colorado. It was not until 1876 that Colorado became a state. By the 1870s, the transformation of prairie grasslands in Kansas

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[1] *Kansas v. Colorado*, 206 U.S. 46, 51 L.Ed. 956, 27 S.Ct. 655 (1907); *Colorado v. Kansas*, 320 U.S. 383, 88 L.Ed. 116, 64 S.Ct. 176 (1943).

[2] See Kan. Exh. 129, Vol. I at 31-38, describing numerous actions within Kansas, and between Kansas and Colorado water users.

[3] Of the first seven members appointed to the body charged with administering the compact, five had served on the commission that negotiated the compact.

into irrigated farms and small towns was well underway. Kan. Exh. 129, Vol. I at 17. Kansas alleged in its first suit against Colorado that by 1883 practically all of the bottom lands of the Arkansas Valley in Kansas, were in a state of "successful and prosperous cultivation in reliance upon the waters of the Arkansas River" *Kansas v. Colorado*, 206 U.S. 46 at 51, 51 L.Ed. 956, 27 S.Ct. 655 (1907).

Prior to 1885, Colorado users took "comparatively little water" from the Arkansas River for irrigation purposes. *Id.* at 107-108. However, development in Colorado came rapidly with the construction of large irrigation canals and storage facilities. Kansas alleged that by 1901 Colorado users were diverting "all the natural and normal waters and a large portion of the flood waters" of the Arkansas River. *Id.* at 52.

The 1901 action was the first interstate water controversy heard by the Supreme Court. Initially, the Court's jurisdiction was challenged, but a demurrer on that basis was overruled. Moreover, the Court determined that Kansas could properly represent the interests of its citizens. *Kansas v. Colorado*, 185 U.S. 125, 46 L.Ed. 838, 22 S.Ct. 552 (1902).[4] Substantively, Kansas contended that nonriparian arid lands were being irrigated in Colorado, and that under English common law Kansas was entitled to receive the flows of the Arkansas River as they existed "before any human interference." *Kansas v. Colorado*, 206 U.S. 46 at 85, 98. Colorado, on the other hand, claimed the right of its users under Colorado appropriative doctrine

[4] The jurisdictional issue was further considered in *Kansas v. Colorado*, 206 U.S. 46 at 80-85, 51 L.Ed. 956, 27 S.Ct. 655 (1907).

to take all of the streamflow, without regard to any downstream impact in Kansas. *Id.*

Not surprisingly, the Supreme Court rejected both of these extreme positions. Instead it ruled that the dispute should be adjusted ". . . upon the basis of equality of rights as to secure as far as possible to Colorado the benefits of irrigation without depriving Kansas of the like beneficial effects of a flowing stream." *Id.* at 100. This was the first expression of the doctrine of equitable apportionment of benefits in regard to interstate streams.

Reviewing the evidence in this early case, the Court found that the diminution of flow caused by Colorado irrigation had worked some detriment to Kansas, but comparing that detriment to the benefits in Colorado, the Court concluded ". . . it would seem that equality of right and equity between the two states forbids any interference with the present withdrawal of water in Colorado for purposes of irrigation." *Id.* at 114. The Court cautioned, however, that "it is obvious that if the depletion of the waters of the river by Colorado continues to increase there will come a time when Kansas may justly say that there is no longer an equitable division of benefits, and may rightfully call for relief against the action of Colorado, its corporations and citizens, in appropriating the waters of the Arkansas for irrigation purposes." *Id.* at 117.

It was Colorado however, not Kansas, that next brought the ongoing dispute back to the Supreme Court. In 1928 Colorado filed a bill in equity seeking to protect the rights established by the earlier decree, and to enjoin further prosecution of suits between water users in the

two states. That action was not decided by the Supreme Court until 1943. *Colorado v. Kansas*, 320 U.S. 383, 88 L.Ed. 116, 64 S.Ct. 176 (1943). A Master appointed to take evidence found that indeed there had been a material increase in river depletions caused by use in Colorado since the first Supreme Court decision. 320 U.S. at 391. Accordingly, he recommended a specific apportionment of the dependable flows of the river, namely, five-sixths to Colorado and one-sixth to Kansas. *Id.* at 390.

Once again, however, Kansas was turned away. The Supreme Court rejected the Master's finding that Colorado's use had materially increased,[5] as well as his recommendation for a specific allocation of flows. The only relief granted was to enjoin the private litigation. The Court explained its cautious approach in these words:

> "The reason for judicial caution in adjudicating the relative rights of states in such cases is that, while we have jurisdiction in such disputes, they involve the interests of quasi-sovereigns, present complicated and delicate questions, and,

[5] George S. Knapp, Chief Engineer of the Kansas Division of Water Resources, complained that the Supreme Court was mistaken in its conclusion that Colorado diversions had not changed since 1907. Knapp thought the Court had relied on a table in the Colorado brief showing a decrease in diversions between 1912-15 and 1931-40 from 1,145,000 acre-feet annually to 877,000. However, he claimed that the records of Colorado's own state engineer demonstrated an increase. See Kan. Exh. 129, Vol. I at 166-67. By way of comparison, Colorado in the present case computed average diversions for 1950-85 at 884,881 acre-feet annually, with some high years exceeding 1,400,000 acre-feet. Colo. Exhs. 838, 839. These surface diversion figures do not include pumping, although they do include transmountain imports.

> due to the possibility of future change of conditions, necessitate expert administration rather than judicial imposition of a hard and fast rule. Such controversies may appropriately be composed by negotiation and agreement, pursuant to the compact clause of the Federal constitution. *We say of this case, as the court has said of interstate differences of like nature, that such mutual accommodation and agreement should, if possible, be the medium of settlement, instead of invocation of our adjudicatory power."* *Id.* at 392, emphasis added.

Against the background of this second Supreme Court decision, and the urgent need to develop operating principles for the storage of water in the newly constructed John Martin Reservoir,[6] the states renewed their efforts to negotiate an interstate compact.[7] After some

[6] Construction of John Martin Reservoir began in 1939 and was sufficiently completed to permit limited storage in 1942. Jt. Exh. 129 at 47. Gen. Kramer reported that the reservoir had an original storage capacity of approximately 700,000 acre-feet. It is located on the mainstream about 58 miles upstream from the Colorado-Kansas border. The upper 280,000 acre-feet of storage capacity was initially allocated to flood control, with the remaining 420,000 acre-feet assigned to water conservation. Jt. Exh. 15 at 33.

[7] In 1921 and 1923 the legislatures in both states had authorized the appointment of commissioners to negotiate an interstate compact. Colorado named Delph E. Carpenter, a highly respected Colorado lawyer who had initiated the compact effort. Kansas selected George S. Knapp, then its Irrigation Commissioner. These two men drafted a tentative Arkansas River Compact which was submitted in 1925 to irrigation interests in both states for their comments. However, opposition developed and the proposed compact was never ratified. Kan. Exh. 129, Vol. I at 39-45.

three years of formal negotiations, the Arkansas River Compact was finally completed and approved in 1949. Pursuant to Article IX-A the compact became effective upon ratification by each state legislature and consent by Congress. 1949 Colo. Sess. Laws 485, § 1, codified at C.R.S. § 37-69-101 (1973); 1949 Kan. Sess. Laws 829, codified at Kan. Stat. Ann. § 82a-520; Act of Congress of May 31, 1949, 63 Stat 145. A copy of the compact is included as Exhibit 1 in the Appendix.

The compact recites that its major purposes are to settle existing disputes, to remove causes of future controversy, and to "Equitably divide and apportion" the waters of the Arkansas River, "as well as the benefits arising from the construction . . . of John Martin Reservoir." Articles I-A, I-B. The compact does not allocate to Kansas either a defined quantity of Arkansas River water, or a specific share of the river flow.[8]

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[8] The lack of a specific allocation was not an issue before Congress. Support there for the compact was universal and enthusiastic. Gen. Hans Kramer, the United States representative on the Compact Negotiating Commission, and its chairman, reported that both states had sought ". . . to attain a definitive solution to their perennial problem of apportionment of the waters of the Arkansas River." Jt. Exh. 15 at 33. He was of the firm conclusion that the compact provided a "fair, constructive, and workable solution" to the controversy. *Id.* at 36. He went on to pay tribute to the compact commissioners:

> "It has been an unusual experience to participate in these negotiations. To my knowledge they have been of a different character from most interstate compacts in that they have been preceded by this long history of litigation, so that the compact commissioners, you might say, came into the arena wearing gloves, ready to continue slugging. But fortunately, as has been testified to here by the representatives of both States, that attitude did not continue very long and we were fortunate in clearing the atmosphere of all the prejudice and awkwardness that goes with a long history of litigation.
>
> "The commissioners approached this matter in a fair-minded way. They were men of good will, good intent, and of good faith. I think their work is a monument to that approach and to that philosophy. It is, to my mind, a fine example of the way interstate arguments ought to be settled." *Id.* at 37.

With respect to this case, one of the key provisions of the compact is found in Article IV-D. It states that the compact is not intended to prevent future development of the Arkansas River Basin in Colorado by either federal or state agencies, or by private enterprise, which may involve the construction of dams, reservoirs and other works, ". . . Provided, that the waters of the Arkansas River . . . shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction."

Administration of the compact is vested in the Arkansas River Compact Administration, which consists of three representatives from each state, appointed by their respective governors. Articles VIII-A, VIII-C. A representative of the United States is an ex-officio member, who acts as chairman but has no vote. Article VIII-C. The compact administration can act only with full agreement. It provides that each state shall have but one vote, and every action of the Administration "shall require unanimous vote." Article VIII-D. The requirement for continued agreement between the two states appears not to

have been a problem in the early years. But changing conditions along the river gradually began to erode the early promise of the compact.

In the years following approval of the compact, farmers in Colorado constructed a large number of new wells along the Arkansas River.[9] These wells were used generally to supplement surface diversions delivered through the various canal companies. RT Vol. 66 at 32-34; Jt. Exh. 157 at 10. Through the use of wells, farmers could better time the availability of their water supplies and grow higher value crops. RT Vol. 66 at 32-33, 46. No one questions the fact that these wells depleted river flows, perhaps more slowly than the canal companies' surface diversions, but with the same inevitability. Jt. Exh. 157 at 11; Jt. Exh. 78; RT Vol. 76 at 56; RT Vol. 30 at 59; *Kuiper v. Atchison, Topeka & Santa Fe Ry. Co.*, 195 Colo. 557, 581 P.2d 293 at 294-95 (1978).

During the period when most of the new wells were constructed,[10] Colorado required either no prior state

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[9] In a 1968 study, the United States Geological Survey ("USGS") reported there were 1,348 "large-capacity" irrigation wells located in the valley fill aquifer along the river in Colorado. Jt. Exh. 66 at 2. Groundwater in this aquifer is in hydraulic continuity with the mainstem of the river, and the surface flows and groundwater constitute a common supply. Pumping increased, according to this study, from 31,000 to 185,000 acre-feet annually in the period 1950 to 1965. *Id.* at 5. Another USGS report puts the 1964 well production at 230,000 acre-feet. Jt. Exh. 74 at 20.

[10] Of the 1,348 large irrigation wells found in 1968, the USGS reported that about 1,000 had been constructed between 1950 and 1965. Jt. Exh. 66 at 1. It was not until 1965 that

approval at all or, after 1957, only a ministerial permit. Subsequent efforts by the legislature and the Colorado state engineer's office to control well production and to bring these wells under the state's statutory appropriation system ran into strenuous opposition. The success of the various attempts at control were limited at best.

In the 1970s the United States also completed construction of two more large dams and reservoirs in Colorado. Pueblo Reservoir, finished in 1975, is located on the mainstem of the Arkansas shortly after it emerges from the Rocky Mountains. Trinidad Reservoir is situated on the Purgatoire River, the main tributary of the Arkansas in Colorado, and was completed in 1976. Storage in each of these reservoirs has become an issue in this case.

By the early 1980s, Kansas began its own investigation of possible compact violations arising from the impact of postcompact wells and the operation of the two federal reservoirs (Pueblo and Trinidad) on the river flows reaching Kansas. Colorado concedes that during the 1970s postcompact pumping caused a decline in Stateline flows,[11] although on several grounds Colorado

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Colorado first attempted to regulate groundwater production, and that initial effort was struck down by the Colorado Supreme Court. *Fellhauer v. People*, 167 Colo. 320, 447 P.2d 986 (1968). Colorado acknowledges that most of the postcompact wells were drilled in the 1950s and early 1960s. Colo. Closing Well Br. at 13. See also Colo. Exh. 165*, Table A.1.

[11] Colo. Opening Statement, RT Vol. 59 at 16; Colo. Closing Well Br. at 11, 19. The spelling of "Stateline," capitalized and used sometimes as a noun and at other times as an adjective, fits none of the traditional rules. However, this spelling and use appears in the compact itself and has been consistently adopted by the parties, so it is used here.

disputes the right of Kansas to a larger share of river flows. RT Vol. 81 at 155-56; RT Vol. 84 at 42; RT Vol. 115 at 62; RT Vol. 66 at 128-29, 132. After making a formal complaint to the Arkansas River Compact Administration, Kansas came to believe that the unanimous vote requirement of the compact would continue to thwart any administrative relief. Kansas thus turned back to the Supreme Court, filing this action in December 1985.

SECTION II

STRUCTURE OF THE REPORT AND RECORD

This Report embraces my findings and recommendations following completion of the liability phase of the trial. The remedy issues, including damages, were severed pending a final determination on liability. The Report is comprised of five parts. Part I is the primary post-trial Report. Parts II, III, IV and V represent substantive decisions made earlier during the course of trial but which, with the approval of the parties, have been held for Supreme Court review until now. Part II is my decision, subject to confirmation of the Court, to grant Colorado's motion for partial summary judgment on the legal issue of whether the Winter Water Storage Program in Pueblo Reservoir was subject to the approval of the Arkansas River Compact Administration. Part III is my decision, subject to confirmation of the Court, to dismiss the Kansas claim arising from the operation of Trinidad Reservoir. Parts IV and V include my decisions, subject to confirmation of the Court, to dismiss the two Colorado counterclaims.

A separate Appendix is also provided. The Appendix includes certain other decisions and orders, important to the conduct and outcome of the trial, but not in and of themselves determinative of final substantive issues. These include my denial of Colorado's motion to stay and to return certain issues to the Arkansas River Compact Administration for failure to exhaust administrative remedies (Exhibit 5); my order granting Kansas' motion to bifurcate the trial into liability and remedy phases (Exhibit 6); my order governing discovery procedures for

expert witnesses and certain other pre-trial matters and the amendment thereto (Exhibit 7); my order concerning the conduct of the trial following the disability of Kansas' chief technical expert (Exhibit 8); and my order on the admissibility of Dr. Dracup's notes (Exhibit 9). Numerous other orders were issued on various discovery and evidentiary issues. These are not included in the Appendix, but may be found in the record if the parties should take exception to any of them.

The Appendix also includes copies of the amended pleadings on which the case was tried (Exhibits 2, 3, and 4), as well as certain key exhibits. Other items in the Appendix are noted as they appear in the text.

The record (apart from exhibits and the reporter's transcript) has been maintained in two separate files. The first consists of 26 volumes, and includes all pleadings, motions, briefs, decisions, orders and discovery documents. A comprehensive index and an index within each volume have been prepared for these documents. The second file is comprised of 12 volumes and includes all of the correspondence with and among the parties, and occasionally others. All documents in both files have been date-stamped and filed chronologically.

The reporter's transcript consists of 143 volumes through oral argument on my Draft Report, with a separate volume for each day of trial. Initially the transcripts were numbered with Roman numerals only. But this system became increasingly cumbersome as the trial lengthened. Arabic numerals were then substituted, and these have been used in the citations to the record. The reporter's transcript is cited in this Report as "RT Vol. 88 at

105." Each volume of the transcript includes an index identifying the witnesses who testified, and any exhibits admitted into evidence, including appropriate page references. Certain corrections to individual transcripts were made pursuant to stipulations of the parties and by my orders dated January 5, 1994 and March 11, 1994. These are included in Appendix Exhibits 12 and 13, respectively, and a copy of the pertinent order is included in each affected transcript.

Exhibits have been divided into four groups: those submitted by Kansas, by Colorado, by the United States, and the joint exhibits. Each exhibit is contained in a separate folder, except for certain "unique" exhibits such as large mounted maps. The exhibit folders occupy 29 boxes, which have been labeled to show the particular exhibits inside each box. Throughout the trial a number of exhibits were revised, and these are identified with an asterisk following the exhibit number. In some cases more than one revision has occurred and these exhibits will carry more than one asterisk. For example, Kan. Exh. 111*** has undergone a minimum of three revisions.[12] Where revisions have been made, the exhibit folder contains the original form of the exhibit and all of the revisions admitted into evidence. Revisions not admitted, and all exhibits not offered or rejected, are included in a single box and so identified. Some exhibits were lodged with me before trial but were not offered into evidence. These have been retained with my bench copies, and have not been included in the 29 boxes of exhibits.

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[12] Some early revised exhibits were also identified with a date, e.g., Kan. Exh. 111* (12/6/90).

A complete Record of Exhibits has also been prepared. This identifies each exhibit by number, the offering party (or joint exhibit), the date when it was first identified in the trial, the witness or witnesses testifying to the exhibit, and the date of its admission into evidence. Since the reporter's transcripts are all dated, one can easily locate the testimony concerning any particular exhibit.

A final joint exhibit list has also been filed by counsel, a copy of which is included in the first box of joint exhibits. Not all of the joint exhibits on this final list, however, were offered into evidence.

SECTION III

PROCEDURAL HISTORY

A. Pleadings.

Kansas filed its motion for leave to file a complaint, the complaint itself, and a brief in support of the motion on December 16, 1985. The State of Colorado was named as the sole defendant. The complaint alleged that the Arkansas River is an interstate stream and the subject of a 1949 compact, made between the States of Kansas and Colorado and approved by the United States Congress. Kansas charged that the State of Colorado and its water users had materially depleted the usable and available Stateline flows of the Arkansas River in violation of the compact. Specifically, Kansas alleged that Stateline depletions were caused by postcompact wells in Colorado which annually pumped approximately 150,000 acre-feet of groundwater related to flows in the Arkansas River.

Kansas also alleged that Colorado had blocked an administrative investigation by the Arkansas River Compact Administration into Colorado's compact violations. The compact provides that all actions of the compact administration must be by unanimous vote, each state having one vote. The compact administration is chaired by the United States representative, but the United States has no vote. According to the Kansas complaint, the alleged violations which Kansas put before the compact administration included: the impact of postcompact wells; the operation of Trinidad Reservoir located on the Purgatoire River, a main tributary of the Arkansas River; the consequences of future increases in the consumption

of return flows from water imported by Colorado into the Arkansas River Watershed; and Colorado's rejection of a 1951 resolution of the Arkansas River Compact Administration allegedly requiring that any storage of the native waters of the Arkansas River be approved by the compact administration. This last issue related to Pueblo Reservoir located on the mainstem of the Arkansas, and the operation of the so-called Winter Water Storage Program in that reservoir.

The prayer of the original complaint sought a decree commanding Colorado, its officers, citizens and political subdivisions to deliver the waters of the Arkansas River in accordance with the provisions of the compact.

Colorado responded on February 18, 1986 by filing a brief in opposition to the Kansas motion. Essentially, Colorado argued that Kansas had failed to demonstrate that an investigation by the Arkansas River Compact Administration would not be an adequate means of vindicating the allegations of compact violations. Colorado claimed there was substantial disagreement over the issue of postcompact well development in Colorado, and whether such development had materially depleted Stateline flows in violation of the compact. Premature invocation of the Supreme Court's jurisdiction, argued Colorado, would deny the Court the benefit of the special expertise and abilities of the compact administration in addressing these complex hydrologic issues. Moreover, Colorado asserted that the compact administration was not "deadlocked or unable to act," but had been proceeding in a cooperative manner to conduct the necessary investigation. Colo. Brief in Opposition at 8.

Before the Supreme Court ruled, however, Kansas filed a new motion, for leave either to file its original complaint, ". . . or, in the alternative, that the court order the State of Colorado to comply with Article VIII(H) of the Arkansas River Compact . . . to promptly investigate all of Kansas' allegations of Compact violation." Kan. Motion for Leave to File Complaint, Mar. 3, 1986, p. 8. Briefs were then filed by both states on the original Kansas motion for leave to file its complaint, or in the alternative, to compel an administrative investigation by the Arkansas River Compact Administration. The Kansas brief outlined in further detail the efforts made within the compact administration, and the alleged frustration of the administrative procedure.

On March 24, 1986, without further argument, the Court issued the following order:

> "The motion for leave to file a bill of complaint is granted. Defendant is allowed sixty days within which to file an answer." 475 U.S. 1079, 89 L.Ed.2d 712, 106 S.Ct. 1454 (1986).

On May 22, 1986 Colorado filed its answer and counterclaim to the Kansas complaint. Colorado denied the allegations of compact violations, and asserted several affirmative defenses. Colorado again alleged that Kansas had failed to exhaust its administrative remedies under the compact, and that its claims were barred by laches and other equitable doctrines. It also alleged that irrigated acreage in Colorado had declined since adoption of the compact, while irrigation in Kansas had increased. Colorado charged that Kansas was seeking to have the Court rewrite the Stateline delivery obligations of the

compact so as to maintain this postcompact Kansas economy. Colorado further alleged that transmountain imports from the western slope of the Rocky Mountains were not subject to the compact nor any claim of Kansas. Finally, Colorado alleged that the Winter Water Storage Program in Pueblo Reservoir was not subject to approval by the compact administration, and that Kansas was barred from asserting such claim by virtue of a 1980 Operating Plan adopted by the compact administration and the benefits received by Kansas under this plan.

Colorado also asserted two counterclaims: (1) that Kansas had stored water released from John Martin Reservoir in violation of the compact; and (2) that wells in Kansas had depleted the supply of surface water available to Kansas users, and had thus caused Kansas to make additional demands for releases of water stored in John Martin Reservoir in Colorado, to the detriment of Colorado users. Kansas' reply to Colorado's counterclaim was filed on June 11, 1986.

On February 24, 1989, with leave of the Supreme Court, Kansas filed a motion to supplement the allegations in its original complaint. In addition to charging compact violations of Articles IV-D and V-F, Kansas sought to add violations of Articles V-E(3), V-E(4) and V-H(2). Colorado opposed the amendment. The United States, which by then had intervened, took no position since no federal interests were involved.

On May 19, 1989, Kansas filed a second motion to amend its complaint by adding claims for both general and special damages. This motion was based upon the Supreme Court decision in *Texas v. New Mexico*, 482 U.S.

124, 96 L.Ed.2d 105, 107 S.Ct. 2279 (1987), in which for the first time damages were allowed as a remedy for breach of an interstate compact. Colorado did not oppose the amendment for general damages based upon the alleged depletion of Kansas' share of the Arkansas River. However, Colorado did object to the claim for special damages resulting from depletion of groundwater in the Ogallala Aquifer, essentially a nonrenewable source, if this claim were based upon facts not originally alleged. In its reply, Kansas acknowledged that the claim for special damages did in fact stem from allegations already made. Again, the United States took no position on this second motion to amend. By order of October 12, 1989, I allowed both Kansas amendments. Colorado and the United States thereupon filed answers to the Kansas First Amended Complaint.

The case was tried on the basis of these amended pleadings, copies of which are included in the Appendix as Exhibit 2 (Kansas First Amended Complaint); Exhibit 3 (Colorado Answer to First Amended Complaint and Counterclaim); and Exhibit 4 (Answer of the United States to the First Amended Complaint).

B. Special Master.

On July 7, 1986, the Court appointed the Hon. Wade H. McCree, Jr. as the Special Master in this case. 478 U.S. 1018, 92 L.Ed.2d 736, 106 S.Ct. 3330 (1986). Judge McCree conducted an initial pretrial conference on August 20, 1986. At that time, the parties agreed that discovery would be conducted under Rules 26-37 of the Federal Rules of Civil Procedure, or by stipulation. The states also

agreed upon certain other arrangements for the production and copying of documents and records. A written stipulation including the various agreements was mailed to Judge McCree on December 17, 1986, but he died before giving his approval. Nonetheless, the parties have continued to honor the stipulation, and the case has generally been tried according to the Federal Rules of Civil Procedure. (See Supreme Court Rules for original jurisdiction, Rule 17.)

I was appointed to replace Judge McCree as Special Master on October 19, 1987.[13]

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[13] The Court's order referring this matter to me states:

"It is ordered that Arthur L. Littleworth, Esquire, of Riverside, California, be appointed Special Master in place of the Honorable Wade H. McCree, Jr., deceased.

"The Special Master shall have authority to fix the time and conditions for the filing of additional pleadings and to direct subsequent proceedings, and authority to summon witnesses, issue subpoenas, and take such evidence as may be introduced and such as he may deem it necessary to call for. The Special Master is directed to submit such reports as he may deem appropriate.

"The compensation of the Special Master, the allowances to him, the compensation paid to his legal, technical, stenographic and clerical assistants, the cost of printing his report, and all other proper expenses, including travel expenses, shall be charged against and be borne by the parties in such proportion as the Court may hereafter direct."

C. Initial Proceedings.

My first status conference was held on February 26, 1988 in a hotel near the Los Angeles airport. In addition to representatives of the two states, counsel for the United States also attended. The United States indicated that it was then in the process of deciding whether or not to intervene. Three federally owned dams and reservoirs have been constructed within the Arkansas River system in Colorado. These are John Martin Reservoir, Pueblo Reservoir and Trinidad Reservoir. Operations of the latter two are at issue in this case. Neither of the states objected to the participation of the United States as an intervenor.

(1) Place of Trial.

At this first meeting the place of trial was discussed. Counsel for both states indicated a preference for a neutral location outside of both states. The Los Angeles area appeared to be the best choice, and ultimately I arranged for courtroom space in the United States Court of Appeals, Ninth Judicial Circuit, Federal Building, 125 South Grand Avenue, Pasadena, California. The trial was held at that location.

(2) Exhaustion of Administrative Remedies.

At this initial status conference, Colorado indicated that it was again going to raise the issue of Kansas' exhaustion of administrative remedies as to two claims in the complaint. These related to the operation of Trinidad Reservoir on the Purgatoire River, and the postcompact

wells in Colorado. It was agreed that the exhaustion issue should be decided on motion, and on March 14, 1988, I issued an order requiring Colorado to file its motion within sixty days, and setting forth a briefing schedule for responsive and reply briefs. Oral argument was also held, in the Federal Court of Appeals in Pasadena on September 28, 1988. As part of its motion to stay, Colorado filed four large volumes of appendix documents, which dated back a number of years and which appeared to include all of the pertinent compact administration record with respect to postcompact well development and Trinidad Reservoir.

My decision on this motion was issued October 21, 1988. I denied the Colorado motion to return these issues to the compact administration, finding that such action would not be effective and that further delay would not be fair. The structure of the compact administration is such that even a preliminary investigation of the Kansas allegations had not proceeded. By exercising its veto on the commission, even though done in good faith, Colorado effectively prevented "authoritative Commission action." See *Texas v. New Mexico*, 462 U.S. 554, 568, 77 L.Ed. 2d 1, 103 S.Ct. 2558 (1983). A copy of my decision is included as Exhibit 5 in the Appendix.

(3) Site View.

It was also agreed at the first status conference that a site view of the Arkansas River Basin would be helpful. Accordingly, a tour was held on September 13 and 14, 1988, with representatives of both states and of the United States present. The itinerary covered both a land

and air inspection of the Arkansas River Basin from Pueblo, Colorado to Garden City, Kansas, including the Purgatoire River drainage area and Trinidad Reservoir.

(4) Partial Summary Judgment on 1951 Compact Administration Resolution.

Finally, at the Los Angeles status conference, it was agreed that the Kansas claim on the 1951 Compact Administration Resolution could be bifurcated and decided as a matter of law. In its complaint, Kansas alleged that any reregulation of the native waters of the Arkansas River requires the approval of the compact administration, based upon a resolution adopted by the administration on July 24, 1951. Specifically, this claim applies to the Winter Water Storage Program in Pueblo Reservoir. On November 28, 1988, Colorado filed a Motion for Partial Summary Judgment on this issue. Extensive briefs were filed by both states, together with several volumes of documentary evidence, some going back to events leading up to the adoption of the Arkansas River Compact in 1949.

My decision on the Colorado motion was issued September 15, 1989; I recommended that the motion for partial summary judgment be granted. This motion dealt with a discrete legal issue, namely, whether the compact administration had the authority to approve or disapprove the Winter Water Storage Program in Pueblo Reservoir. As part of these general proceedings, Colorado also moved that the question of any actual impact on Kansas of the Winter Water Storage Program be referred back to the compact administration. Again, the grounds were

based upon the alleged failure by Kansas to exhaust its administrative remedies. I denied that motion, and therefore the factual issue of whether the operation of the Winter Storage Program has materially depleted the waters of the Arkansas River in violation of the compact comprised one of the major issues at trial. A copy of my decision on these winter storage motions is included in this Report as Part II.

(5) Intervention by the United States.

The United States, on January 31, 1989, filed a Motion for Leave to Intervene as a Party Defendant. The motion was accompanied by a Stipulation for Intervention signed by counsel for both states. My order, dated February 9, 1989, granted the motion, allowing the intervention of the United States to represent the federal interests raised by the Kansas complaint and the answer and counterclaim filed by Colorado.

(6) Severance of Damage and Remedy Proceedings.

As part of the Kansas motion to amend its complaint to add claims for damages, Kansas also moved to sever all proceedings relating to damages, and to reserve those issues for subsequent proceedings following a final decision on liability. Initially, Colorado had strenuous objections to the motion, while the United States took no position. Following briefing and argument, however, Colorado focused its opposition on specific matters, and I attempted to recognize those concerns in my order. On

January 2, 1990 I granted the Kansas motion to bifurcate the trial into liability and remedy phases, provided that Colorado would not be limited during the liability phase from introducing such economic or other evidence related to damages as might be necessary to its defense on the issue of liability, or in support of its affirmative defenses or counterclaims. A copy of this order is included as Exhibit 6 in the Appendix.

(7) Allocation of Fees and Costs.

Pursuant to the agreement of the parties, and by order dated October 9, 1989, fees and costs in this case were allocated as follows: 40% to the State of Kansas, 40% to the State of Colorado, and 20% to the United States. The United States' share has been calculated from the time that it intervened, February 9, 1989.

D. Discovery, Expert Witnesses and Motions.

The parties began serious discovery in the fall of 1988. Discovery was extensive and became increasingly contentious. Numerous motions to compel production of documents and answers to interrogatories were filed. There were motions to quash subpoenas and motions to enforce compliance with subpoenas. Privileges were invoked and an *in camera* inspection was required. Protective orders and sanctions were sought. Motions *in limine* to exclude certain witnesses and areas of testimony were filed. No useful purpose would be served by reviewing these proceedings in detail. They occupy many volumes

in the records of this case, and can be specifically identified from the index. Perhaps it is sufficient here to report that I believe that all appropriate information was ultimately made available to the parties. Nor did any party acquire information that should have been protected. Finally, none of the discovery disputes seem to have carried over into the trial, or to have adversely impacted the full presentation of the parties' respective cases.

On September 22, 1989 I ordered that the parties designate their expert witnesses and the subject matter of their testimony by January 15, 1990. Kansas identified 24 experts, Colorado 41, and the United States 2. Not all of those originally identified actually testified, and under later procedures, some additional experts appeared who were not at first named. While some nonexperts also testified, the trial was dominated by expert witnesses.

Following a pretrial conference and argument on February 16, 1990, an additional order governing the discovery procedures for expert witnesses and certain other pretrial matters was issued. A copy of that order, dated March 7, 1990, together with the amendment thereto, is included as Exhibit 7 in the Appendix. The order required that all parties provide statements of the substance of the facts and opinions to which their expert witnesses were expected to testify, and a summary of the grounds for each opinion stated, as required by Rule 26(b)(4)(A)(i). A period of two months was allowed for the depositions of the Kansas experts, and an equal period for the depositions of the Colorado and United States experts. Copies of all exhibits were required to be exchanged by August 15, 1990. The authenticity of all documents designated as exhibits was deemed to be

admitted unless written objections were filed by August 29, 1990. All pretrial motions were required to be filed no later than August 15, 1990.

Certain substantive motions were disposed of before trial. For example, Colorado sought a ruling of law on the meaning of Article V-E(5) of the compact. This motion was denied, and the issue deferred to the trial. Kansas sought to have Colorado's affirmative defenses stricken. This motion, too, was denied.

The trial date was then set for September 17, 1990, and trial did commence on that date.

E. Pretrial Filings.

The pretrial order of March 7, 1990, required the parties to file statements of entitlement, in addition to pretrial statements. These statements taken together provide detailed views of the entitlements claimed by each state to receive or use the waters of the Arkansas River under the Arkansas River Compact. Moreover, they include considerable documentary evidence intended to support their positions.

Many of the hydrologic data and the facts concerning water use in Colorado and Kansas are in substantial dispute in this case. Similarly, the parties hold disparate views on the intent and meaning of the Arkansas River Compact. For these reasons, an agreed statement of facts was not possible. However, the parties did agree upon 169 joint exhibits which were lodged prior to trial. This number was supplemented by four additional joint exhibits filed shortly after trial began.

F. Trial.

The liability phase of the trial commenced on September 17, 1990. That portion of the trial was completed on December 16, 1992. During this period of time, there were 141 actual trial days. The reporter's transcript includes 19,735 pages through completion of the evidence, and the number of exhibits admitted and lodged exceeds 2,000.

The Kansas case was presented during the fall of 1990 and appeared to be largely completed by the end of January, 1991. At that time, the Kansas expert on the stand was Timothy J. Durbin. He was Kansas' chief technical expert and had begun his work on this case in 1985. After testifying for approximately one month, under direct and cross-examination, Mr. Durbin suffered a breakdown and was admitted to a psychiatric hospital. In the latter part of his cross-examination, it began to appear that a number of errors had been made in various Kansas exhibits, including at least one significant mistake in the coding instructions to the Kansas hydrologic-institutional model. Kansas began to file overnight revisions, sometimes more than once, to certain key conclusionary exhibits. This computer model was crucial to the Kansas case. It was used to estimate depletions in Stateline flows from 1950 to 1985 caused by postcompact wells and the Winter Water Storage Program in Colorado.

The trial was recessed while I attempted to find out more about Durbin's condition and when he would be able to return. A medical report was obtained from his attending physician, and Colorado requested that I obtain a second opinion which it paid for. I kept the details of

these medical reports confidential, although their general conclusions were made known to the parties. From my conversations with the two psychiatrists, and my review of their reports, I concluded that to protect Mr. Durbin's future well-being, and ultimately the proper presentation of the Kansas case, he should not be pressured into returning. It was clear that he would not have been able to resume his trial responsibilities soon, if at all.

Meanwhile, Kansas filed a formal motion to continue the trial for seven months in order to obtain and prepare replacement experts. Colorado objected to such a lengthy continuance for reasons which are discussed in detail in my March 27, 1991 order on the Kansas motion. A copy of that order is included as Exhibit 8 in the Appendix. The Kansas motion, of course, would also have delayed Colorado, which was then fully prepared and ready to proceed with its case. While I ruled that completion of the Kansas case on direct, and any rebuttal evidence, should be continued until either Mr. Durbin was able to resume or replacement experts were prepared, I did not believe that it was necessary or desirable to stop the trial entirely. Accordingly, Colorado was ordered to begin the presentation of its case, reserving Kansas' right to cross-examine on Colorado's modeling testimony when Kansas had expert assistance available. Under this modified trial procedure, Colorado completed its case in chief on May 30, 1991, subject to its right to respond to the completed Kansas case. RT Vol. 87 at 153, 156.

Because of other trial conflicts affecting various counsel and experts, the trial could not be resumed until February 24, 1992. At that time, Kansas began the presentation of what it called its "replacement case." Its new

chief expert was Steven P. Larson, who was assisted by several Kansas experts who had testified earlier but who now assumed expanded roles. Kansas referred to this group as its "replacement experts."

This team had made a number of corrections and modifications to the Kansas hydrologic-institutional model. Many of these changes had been recommended by the Colorado experts. Kansas lodged 63 modified exhibits, changing previously admitted evidence, and also lodged 10 new exhibits. As a result of this new work, the replacement experts testified that the Stateline depletion figures claimed earlier by Kansas were not reliable. They offered new opinions, substantially reducing the amount of the Kansas claim. For example, the exhibits presented through Mr. Durbin showed that postcompact wells in Colorado over the period of 1950-85 had caused depletions in the Arkansas River flows into Kansas totaling approximately 1,581,000 acre-feet. Kansas Exh. 111*. Larson reduced this amount to 852,000 acre-feet. Kansas Exh. 111***.[14] Kansas completed its replacement case and rested on March 18, 1992. RT Vol. 100 at 80-81.

Because of the modifications made to the normal order of trial, additional depositions were required from time to time, and many new exhibits not initially listed

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[14] These figures are in terms of depletions to total flows, not to usable flows. Ultimately, the compact requires that usable flows be addressed, but for illustrative purposes here the comparison between Durbin and Larson is more easily made using total flow figures. Also, these figures do not reflect any offset for return flows from transmountain imports. Kansas acknowledges that this adjustment is also necessary.

were required. However, all computer disks and backup data were required to be exchanged before court testimony. This was accomplished cooperatively, and generally without formal court orders.

Colorado then responded to the Kansas replacement case and completed its own case in chief. This segment of the trial began on April 27, 1992 and lasted through May 27, 1992. RT Vol. 117 at 160.

Presentation of the United States evidence followed immediately after Colorado. Since I had indicated that the Kansas claim arising from operations of Trinidad Reservoir (a federal facility) would be dismissed, the United States evidence centered upon the Winter Water Storage Program ("WWSP") in the Pueblo Reservoir. This program began in 1976 upon completion of Pueblo Reservoir and continued thereafter except for the year 1978. Under the program, Arkansas River flows were stored in the winter for later summer irrigation. Previously, the winter flows had been in part diverted to irrigate bare fields, and thereby increase soil moisture for the next growing season. The issue is whether or not storage and later summer use of this water depleted river flows at the Stateline. The United States completed its presentation on June 19, 1992. RT Vol. 124 at 102.

Kansas' rebuttal testimony and surrebuttal by Colorado and the United States commenced on September 21, 1992 and were completed on November 24, 1992. The evidentiary presentations of all parties were completed December 16, 1992. RT Vol. 141 at 107.

By agreement of the parties, opening briefs were submitted simultaneously on March 15, 1993, answering

briefs on May 3, 1993, and final reply briefs on May 17, 1993. Additional responses to specific written questions from me were filed August 24, 1993 and September 3, 1993.

My Draft Report was completed and circulated to the parties on February 4, 1994. Oral Argument on the draft was held on April 14 and 15, 1994.

G. Dismissal of Trinidad Reservoir Claim.

At the conclusion of Kansas' presentation of evidence on the operation of Trinidad Reservoir, counsel for Colorado announced that it would file a motion to dismiss that portion of the Kansas claim.[15] By stipulation, the Colorado motion was filed and briefed during the 1991 recess occasioned by Mr. Durbin's illness.

The motion was based upon the ground that Kansas had failed to demonstrate that the operation of the Trinidad Project resulted in a compact violation. Colorado argued that Article IV-D of the Arkansas River Compact specifically allows future development in Colorado, by federal or state agencies, including dams and reservoirs, provided that such development does not cause a material depletion in the usable flows of the Arkansas River to users in Kansas, and that Kansas had failed to establish the necessary depletion.

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[15] Although Kansas had not rested its entire case, its counsel indicated that Kansas had completed evidence on the Trinidad Project. RT Vol. 78 at 138, 144-45.

The Kansas legal theory was based upon the alleged violation of certain Operating Principles that were approved by the Arkansas River Compact Administration for the operation of the Trinidad Project. Kansas did not attempt to show a material depletion at the Stateline. Kansas took the position that any failure to abide by the Operating Principles constituted a compact violation; that during the initial period of operation of Trinidad Reservoir (from 1979 to 1984) the tributary inflows from the Purgatoire River into John Martin Reservoir on the Arkansas River were substantially less in certain months than they would have been if the Operating Principles had been strictly observed; and that Kansas was entitled to 40% of the water thus lost to the Arkansas River.

After extensive briefing and oral argument, and subject to confirmation by the Court, the Colorado motion was granted. A copy of my decision, dated June 9, 1992, is included in this Report as Part III.

H. Dismissal of Colorado Counterclaims.

During the 1991 summer recess, Kansas filed a motion to dismiss Colorado's two counterclaims. These were designated as the "Lake McKinney Counterclaim" and the "Well Counterclaim." The motion was filed under the guidance provided by Rule 41(b) of the Federal Rules of Civil Procedure.[16] While Colorado had not yet fully

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[16] Effective December 1, 1991, the vehicle for the result sought by the Kansas motion would be Rule 52(c) rather than Rule 41(b). However, the evidence was taken and briefing completed before the new rule took effect.

rested its case, its evidence on the Lake McKinney Counterclaim had been completed, and my ruling on the Well Counterclaim was not made until that evidence was also complete.

The Lake McKinney Counterclaim was based upon the allegation that Kansas had stored water released from John Martin Reservoir in Lake McKinney in Kansas, in violation of Article V-E(2) of the compact. I found that the Colorado evidence did not establish such a compact violation. Subject to confirmation by the Court, the Kansas motion to dismiss this counterclaim was granted. A copy of my decision, dated April 20, 1992, is included in this Report as Part IV.

Colorado's Well Counterclaim was based on the allegation that development of postcompact wells in Kansas had reduced the usable flow of the Arkansas River in Kansas by causing increased seepage or transit losses; that such losses had resulted in increased demands by Kansas against its storage account in John Martin Reservoir; and that the surplus in the Kansas Transit Loss Account was thereby reduced, 24/35ths of which would otherwise have been distributed to Colorado users. I found against Colorado on this counterclaim, and subject to confirmation by the Court, I granted the Kansas motion to dismiss. My decision, dated July 31, 1992, is included in this Report as Part V.

SECTION IV

DESCRIPTION OF THE ARKANSAS RIVER SYSTEM

The Arkansas River originates on the easterly slopes of the Rocky Mountains upstream of Leadville at elevations above 12,000 feet. The river flows south past the towns of Buena Vista and Salida, then easterly through the Royal Gorge to Canon City, and then into Pueblo Reservoir just upstream from the City of Pueblo. The elevation at Pueblo is 4,662 feet. From Pueblo the river meanders easterly across the Colorado high plains into Kansas. The elevation at the Stateline is 3,350 feet. Long-time USGS measurements at Canon City have been used consistently to represent the mainstream flows from the mountains. The portion of the river system that is involved in this litigation extends from Pueblo, Colorado to Garden City, Kansas. A general location map of the Arkansas River Basin in Colorado and Western Kansas is included in the back cover pocket of Volume I of this Report.[17]

The river valley between Pueblo and the Stateline, a distance of about 150 miles, is a fertile agricultural area with only a few small rural towns. Going downstream from Pueblo, the towns are La Junta, Las Animas, Lamar, Granada and Holly. In Kansas, the character of the land along the river continues to be agricultural. Between the Stateline and Garden City, the distance is approximately 62 miles. Substantially all of the normal surface flows of the Arkansas River are diverted and used by the time the

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[17] Submitted by the parties by letter dated February 21, 1994 for inclusion here.

river reaches Garden City. The river must rely upon more generous downstream tributaries and precipitation for its renewal.

In Colorado, the main tributary is the Purgatoire River, which joins the Arkansas from the south at Las Animas just upstream from John Martin Reservoir. The Purgatoire originates high in the Sangre de Cristo mountains about 40 miles upstream of Trinidad. Like the mainstream, it is fed by runoff from melting snow, and above Trinidad the flows are perennial. The other major contributors to the Arkansas from the south are the St. Charles, Huerfano, and Apishapa Rivers. The flows from these streams are intermittent and come primarily from intense summer rainstorms, although the drainage area of each of these streams includes some mountainous regions.

The major Colorado tributaries from the north are Fountain, Adobe, Horse and Big Sandy Creeks. These streams also are normally intermittent and dependent upon summer rains. With the exception of Fountain Creek, these streams drain the high plains territory and are not as productive as the southern tributaries.

The bed of the mainstream below Pueblo lies in a broad, sandy and frequently shifting channel. In Colorado, the river channel consists of the "valley fill aquifer." This aquifer fills a U-shaped trough cut into bedrock, which includes shale, limestone and sandstone. The valley fill aquifer, often referred to simply as alluvium or alluvial materials or aquifer, is highly permeable.[18] It ranges in width from about one to fourteen miles, with an

[18] These terms were used interchangeably by witnesses at trial.

overall average width of approximately three miles. Thickness of the aquifer reaches more than 200 feet, but with an average depth of about 30 feet. The groundwater in the valley fill aquifer is in hydraulic continuity with the surface flows of the river. They constitute a common water supply. Jt. Exh. 66 at 2; Jt. Exh. 94 at 51. Thus, groundwater supports and contributes to the surface flows of the river, but pumping by wells can draw water away from the river. Jt. Exh. 157 at 11; Jt. Exh. 91 at 3; Jt. Exh. 94 at 1, 51, 53; RT Vol. 30 at 59.

Surface flows of the Arkansas River in Colorado are diverted by 23 major canal companies, which then distribute water to individual farmers. In addition, since 1949 when the compact was approved, farmers in Colorado according to Colorado data have constructed more than 1,300 large irrigation wells located in the valley fill aquifer. Colo. Exh. 165*, Table A.1. The number is even larger according to Kansas. These wells are largely pumped to supplement surface supplies. Surface and groundwater together provide irrigation supplies for more than 300,000 acres between Pueblo and the State-line. Colo. Exh. 823, 827-30.

In certain reaches of the river in Colorado, the river alluvium is flanked by bench areas of older, less permeable deposits. Colorado describes these as "surficial aquifers," while Kansas simply calls them "bench aquifers." In any event, these areas are part of the tributary groundwater supply. Wells located in these areas are not as productive as those drawing from the valley fill aquifer.

In Kansas, the Arkansas River roughly parallels U.S. Highway 50, and passes through the towns of Coolidge,

Syracuse, Kendall, Lakin, Deerfield, Holcomb and Garden City. Kan. Exh. 471; RT Vol. 27 at 50. The distance from the Stateline to Garden City is approximately 62 miles. *Id.* at 52. Originally eight canal companies in Kansas diverted surface flows of the Arkansas River in this reach. Today the Alamo and Fort Aubrey ditches no longer operate, although the lands formerly irrigated by these ditches continue to be irrigated by wells. RT Vol. 28 at 15. The ditch companies remaining in operation between the Stateline and Garden City are: the Frontier, Amazon,[19] Great Eastern, South Side, Farmers and Garden City. Kan. Exh. 389**; RT Vol. 27 at 51-52. In 1988, approximately 57,000 acres were irrigated by surface diversions and alluvial wells. Kan. Exh. 358*; RT Vol. 31 at 57. The primary crops raised are corn, wheat, grain sorghums, alfalfa and soybeans. RT Vol. 27 at 60.

The river alluvium in Kansas between the Stateline and Garden City extends on both sides of the river, generally 1 to 1.5 miles, although a greater distance in some parts. RT Vol. 28 at 65. The thickness of alluvium ranges between 35 and 50 feet. *Id.* at 64. Between the Stateline and the Bear Creek fault zone, the Arkansas River and its associated alluvium occupy a trough eroded through bedrock. RT Vol. 29 at 134. The Bear Creek fault zone, however, cuts across the river just west of Lakin in mid-Kearny County and divides the Arkansas River Valley in Kansas into two distinct parts.[20]

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[19] This is the common name. Technically it is the Kearny County Farmers Irrigation Association Ditch. RT Vol. 27 at 96.

[20] The Bear Creek fault zone is about 48 miles from the Stateline. Jt. Exh. 139.

Upstream, as I have indicated, the river alluvium is underlain by bedrock which is essentially non-waterbearing. Downstream of the fault zone, however, the river alluvium overlies another lower aquifer, generally referred to as the Ogallala. The Ogallala formation is about 275 feet deep in Kearny County and 350 feet deep in Finney County. RT Vol. 28 at 76-77. Since the early 1960s most new or replacement wells have been drilled down to the bottom of the Ogallala. *Id.* at 68. The service areas of the canal companies virtually all overlie alluvium, except for the Great Eastern and Farmers. Kan. Exh. 407-12. Some portions of the ditch service areas also overlie the Ogallala. RT Vol. 28 at 18.

Surface flows of the Arkansas River are also augmented by diversions from the westerly slopes of the Rocky Mountains. Water users in the Arkansas River Basin in Colorado began such importations at the turn of the century, using tunnels and ditches to bring the water across the Continental Divide. RT Vol. 14 at 131 *et seq.* Jt. Exh. 5, Table 10. The Fryingpan-Arkansas project, authorized by Congress in 1962, substantially augmented those private facilities and increased the amounts of water imported. The Fryingpan-Arkansas project includes Ruedi Reservoir on the western side of the Continental Divide, four dams and reservoirs on the eastern slopes of the Rockies (Turquoise Lake, Mt. Elbert, Twin Lakes and Clear Creek Reservoirs) and Pueblo Reservoir on the Arkansas River just west of Pueblo, Colorado. Jt. Exh. 88 at 4.22-4.23. Over the 1950-85 period, transmountain imports have added an average of approximately 60,000 acre-feet per year to the Arkansas River. The Arkansas River Compact excludes such transmountain diversions,

and Kansas makes no claim to them, or to the return flows therefrom. Article III-B; RT Vol. 11 at 127.

SECTION V

DESCRIPTION OF MAJOR STORAGE AND DIVERSION WORKS

A. Surface Diversion Systems.

Surface flows of the Arkansas River in both Colorado and Kansas are diverted and distributed for irrigation through a number of canal companies. Often they are referred to as "ditches," but this friendly colloquialism greatly underplays the size of their facilities and operations. Colorado calculated that surface diversions by the various canal companies between Pueblo and the Stateline averaged 884,881 acre-feet annually for the 1950-85 period. Colo. Exhs. 838, 839. These systems include major diversion structures, as well as distribution and off-stream storage facilities. In Colorado there are 23 canal systems with rights to take water from the Arkansas River between Pueblo and the Stateline. Nine of these canals are located below John Martin Reservoir.

In Kansas, beginning about 1880, eight canals were developed with rights to divert Arkansas River water in the reach from just above the Stateline to Garden City. All of the data on Stateline flows have been adjusted to include Kansas diversions on the Colorado side of the line. Only six of those canals continue to be in operation. Diversions for 1950-88 averaged 78,742 acre-feet annually. Kan. Exh. 371*.

B. Wells.

In addition to the surface diversion systems, a large number of wells have been drilled in both states, most of them after the compact was approved in 1949. In 1985, the evidence showed a total of 2,062 permitted and decreed irrigation wells in Colorado, associated with 171,614 acres. Colo. Exh. 165*, Tables A.1-A.3. These were large wells of 100 gpm or more pumping from the Arkansas River and its associated alluvium, and from the surficial aquifer. In Kansas, a 1988 study found that a total of 16,679 acres between the Stateline and Garden City were being irrigated by wells pumping alluvial groundwater. Kan. Exh. 358* at 1.

C. Canal Company Storage Reservoirs.

Four of the canal systems in Colorado (Holbrook, Fort Lyon, Amity and the Colorado Canal) have off-channel reservoirs providing storage. These include Lake Henry and Lake Meredith; the Holbrook, Dye, Adobe Creek and Horse Creek Reservoirs; and the Great Plains Reservoir System. Colo. Exh. 824. The total storage capacity of these various private systems is in the order of 800,000 acre-feet. Colo. Exh. 3 at 3-12. However, they are relatively shallow and evaporation is extremely high. All of these Colorado canal company reservoirs operate under the Colorado appropriation system with various priority dates. All were in place prior to the Arkansas River Compact.

In Kansas, there is only one small reservoir, Lake McKinney. It is located near Garden City and has a current capacity of approximately 3,600 acre-feet, although it was somewhat larger in earlier years.

D. Trinidad Reservoir.

Major storage on the Arkansas River system is also provided by three federal reservoirs, namely, Trinidad Reservoir on the Purgatoire River, and Pueblo Reservoir and John Martin Reservoir on the mainstream. The Trinidad Project resulted from cooperative studies by the Corps of Engineers and the Bureau of Reclamation in the early 1950s. At first, Kansas opposed the project, stating that "even the most conservative estimates indicate an increased depletion of Purgatoire River water." Jt. Exh. 34 at XV. However, after certain operating principles were approved, Kansas withdrew its opposition. The project was approved by Congress in 1958, and was completed and ready to store water in 1977. Jt. Exh. 35 at 309; Jt. Exh. 23 at 4. The total capacity of the reservoir is in the order of 114,000 acre-feet, providing both flood control and water conservation storage. Jt. Exh. 24a. As already noted, during the trial Kansas pursued a claim for injury based upon an alleged violation of the operating principles adopted for the reservoir. Subject to confirmation by the Court, I have dismissed that claim in a separate decision included as Part III of this Report.

E. Pueblo Reservoir.

Pueblo Reservoir, located on the mainstream of the Arkansas River just above the City of Pueblo, is the

terminal reservoir of the Fryingpan-Arkansas project. That project was authorized by Congress in 1962, and construction of Pueblo Reservoir was substantially completed in 1975. Colo. Exh. 3, Table 2.1. The Fryingpan-Arkansas project is administered by the Southeastern Colorado Water Conservancy District, organized under the laws of Colorado. It is the legal agency responsible for repayment of the reimbursable costs of the project. The 1977 capacity of Pueblo Reservoir was estimated at 357,678 acre-feet. Besides providing flood control, Pueblo Reservoir is used primarily for the regulation of transmountain water imported from the westerly side of the Rocky Mountains under the Fryingpan-Arkansas project. However, the reservoir is also used to store native wintertime flows that are used later for summer irrigation under the Winter Water Storage Program. Colo. Exh. 532. Whether the operation of the Winter Water Storage Program has caused a material depletion in Stateline flows was one of the principal trial issues. The program was begun in 1976 and has been in operation since that time, except for the year 1978.

Pueblo Reservoir also has an independent right to store and retain native flows, with an appropriation date of 1939. However, this right comes into priority only when John Martin is full and all other diversion rights between Pueblo and John Martin have been satisfied. In essence, the right applies only during periods of major flooding. Jt. Exh. 129 at 46.

F. John Martin Reservoir.

John Martin is the largest of the federal reservoirs, located on the mainstream of the Arkansas River about 58 miles above the Stateline. The reservoir was authorized by Congress in 1936, and construction began in 1939. 49 Stat. 1570 (1936), codified at 33 USC §§ 701 *et seq*. After an interruption in construction caused by World War II, the dam and reservoir were completed in 1948. RT Vol. 15 at 35-36. Total storage capacity was approximately 700,000 acre-feet upon completion. 420,000 acre-feet of this capacity was allocated for conservation storage, and 280,000 acre-feet for flood control. Jt. Exh. 16 at 37. Because of sedimentation, however, the conservation storage capacity as of 1988 has been reduced to approximately 338,000 acre-feet. RT Vol. 16 at 126.

Developing criteria for the operation of this reservoir was one of the principal purposes of the Arkansas River Compact. Article V specifically provides how water will be stored and released from the reservoir. The compact creates a "conservation pool" to be operated "for the benefit of water users in Colorado and Kansas, both upstream and downstream from John Martin Dam . . . ." Article IV-C(3). During the winter months, all water entering the reservoir is stored in the conservation pool, except that Colorado has the right to releases equivalent to the river flow up to 100 cubic feet per second ("cfs"). Article V-A.

During the summer, defined as April 1 to October 31, no flows may be stored in John Martin Reservoir when Colorado water users are operating under judicially decreed priorities. Article V-B. Under these conditions,

Kansas is not entitled to any portion of the river flow entering John Martin Reservoir, but is apportioned whatever river flow may cross the Stateline. Article V-G. Downstream from John Martin, the return flows from Colorado users in the area, as well as occasional tributary inflow, contribute to the flow of the river reaching the Stateline.

When Colorado water users are not operating under decreed priorities, all summer flows entering the reservoir are stored, provided that Colorado may demand releases of water equivalent to the river flow up to 500 cfs, and Kansas may demand releases of water equivalent to that portion of the river flow between 500 cfs and 750 cfs. Article V-B.

Under the compact, neither state is allocated a specific share of the water stored in the conservation pool. Rather, such stored water constitutes a common resource to be released ". . . upon demands by Colorado and Kansas concurrently or separately at any time during the summer storage period." Article V-C. Specific release rates are provided for each state, depending upon the amount of water in storage. The only limit, however, upon the total amount of water that either state may take is the requirement that such water must be applied promptly to beneficial use, unless storage thereof downstream is authorized by the compact administration. Article V-E(2). Thus, water demanded by the first state to call automatically reduces the supply available to the other state. As a result, both states in recent times have generally demanded simultaneous releases at maximum rates in order to ensure that they would receive their share of stored water, even though all parties might not be ready

for delivery. Jt. Exh. 129 at 47; RT Vol. 66 at 54; RT Vol. 81 at 127-29; RT Vol. 133 at 76.

In practice, operation under the compact resulted in the storage of most, if not all, of the inflow from November 1 to March 31. In many years at the end of the winter storage season, the reservoir storage was completely drawn down early in the irrigation season, sometimes by mid-April. Jt. Exh. 129 at 47.

In 1980 the Arkansas River Compact Administration adopted a resolution concerning the method of operating John Martin Reservoir. It is entitled "Resolution Concerning an Operating Plan for John Martin Reservoir" and is included as Exhibit 10 in the Appendix, as revised in 1984. Jt. Exh. 21, Doc. 11. The resolution abandons the common pool concept in favor of allocating specific state shares in the stored water. Under the 1980 Operating Plan, 40% of the stored water goes into a separate "Kansas account," while 60% is divided in varying shares among the nine Colorado canal companies located within Colorado Water District 67. *Id.*, Section II-D(2)(3). Kansas and the various Colorado ditches may demand release of the water contained in their respective accounts at any time and at whatever rates they desire. *Id.*, Section II-E(1).

The 1980 Operating Plan also allows three Colorado canal companies, namely, Amity Mutual Irrigation Company, Fort Lyon Canal, and Las Animas Consolidated Canal Company, to store certain "other water" in John Martin Reservoir. *Id.*, Section III-A,B,C. The permitted storage consists of water which Amity could otherwise divert from the Arkansas River and store in the Great Plains Reservoir System, and water which the other two

canal companies could store under an approved Pueblo Winter Storage Plan. *Id.*, Section III-A,B,C.

In exchange for this storage right, the three Colorado canal companies agreed to a 35% water surcharge on all their deliveries into John Martin Reservoir. *Id.*, Section III-D. This 35% goes into a Kansas Transit Loss Account. Releases of stored water from the Kansas account are measured at the Stateline, and transit losses between John Martin and the Stateline are made up from this Kansas Transit Loss Account. *Id.*, Section II-E(4).[21]

G. Transmountain Diversions.

Flows in the Arkansas River have long been supplemented by transmountain diversions imported from the western slopes of the Rocky Mountains. The earliest of these diversions began in the 1880s. Colo. Exh. 3, Table

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[21] The 1980 Operating Plan, as revised on May 10, 1984 and December 11, 1984, is currently in effect. However, the resolution continues on a year-to-year basis, and may be terminated by either state. Section VII-A. Witnesses from both states supported its continued operation. Nonetheless, in its Pre-trial Statement, at pages 165-166, Kansas took the position that:

> ". . . while Kansas believes that the 1980 Resolution results in a more efficient operation of John Martin Reservoir . . . the resolution is an administrative rewriting of Article V of the Arkansas River Compact and thus is *ultra vires* and legally void *ab initio*."

During the trial itself Kansas did not appear to pursue this position. However, in its post-trial briefs Kansas still takes the position that 1980 Operating Plan, although beneficial, is beyond the powers of the compact administration and hence is "illegal." Kan. Reply Br. at 17, 22. This matter is discussed further in Section XIV of this Report.

3.11; Jt. Exh. 5, Table 10. Between 1890 and 1910 a number of tunnels and ditches and three reservoirs in the headwaters area were constructed. During the period 1908-42, imports averaged only 11,987 acre-feet annually. But about 1935 transmountain diversions began to increase significantly, and during the compact negotiations they were averaging approximately 43,000 acre-feet per year. Jt. Exh. 16 at 37; Jt. Exh. 5, Table 10. Not all of the transmountain imports, however, are used along the Arkansas River. These diversions also supply the cities of Aurora and Colorado Springs.

The Fryingpan-Arkansas Project was approved by Congress in 1962. Construction began in 1963 and was virtually complete by 1980, but diversions through the Charles Boustead Tunnel, a part of the project, began in 1972. Since 1972, total transmountain imports through the Fryingpan-Arkansas Project and the various other systems have averaged about 120,000 acre-feet per year. RT Vol. 21 at 25. Estimates of the average amounts delivered for use within the Arkansas River Valley during the 1950-85 period range between 56,210 and 60,445 acre-feet annually. Colo. Exh. 846.

SECTION VI
ARKANSAS RIVER SUPPLY

Most of the hydrologic data analyzed and presented by both states covered the period from 1950 through 1985. The first year after the approval of the compact was 1950, and this action was commenced at the end of 1985. This period of time was also used by Kansas in its hydrologic-institutional model and by Colorado in its water budget analysis. However, certain older reports that included river flow data from earlier years were also submitted into evidence, particularly with respect to the mainstream inflow at Canon City before Pueblo Reservoir was constructed, and the river flows at the Stateline.

Both states used measurements just downstream from Pueblo Reservoir to represent the supply of the mainstream. These data included some transmountain imports, and in more recent years also reflected the impact of storing winter flows in Pueblo Reservoir for later release. However, the total amount of water available for downstream use includes more than just the mainstream inflow at Pueblo. Tributary inflow, releases from other downstream reservoirs, groundwater, precipitation, and return flows from stream diversions and groundwater pumping all add to the total Arkansas River water supply available in Colorado.

A. Mountain Inflow.

While the amounts of tributary inflow and groundwater pumping were sharply contested during the trial, the two states essentially agreed upon the mainstream supply at Pueblo. Kansas computed the average annual

flow to be 585,157 acre-feet for the 1950-85 period, while Colorado put the average at 582,805. Colo. Exh. 831.[22] These data include transmountain imports and the inflow from Fountain Creek. The difference over this period of time is not material for the issues in this case. Most of this water comes from melting snow, and the flows are largest during the spring and early summer. Winter flows are relatively low. Precipitation downstream of Pueblo averages only 12 inches a year, although it increases toward the east and into Kansas. Jt. Exh. 105 at 7. Eighty percent of the precipitation occurs during the growing season of April through October, but without irrigation, rainfall is not sufficient to mature crops. Jt. Exh. 105 at 7.

The estimates by the two states of deliveries of transmountain water during the 1950-85 period were also close. These delivery figures are somewhat less than the total amounts of water imported from the western slope of the Rockies since some of that water is used outside of the Arkansas River area, some is lost to reservoir evaporation, and in a given year water is sometimes held over

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[22] These figures can be compared with longer-term averages at Canon City, where the river emerges from the mountains. An engineering committee report prepared for the compact negotiations shows an average annual flow at Canon City of 514,300 acre-feet for the period 1908-42. Jt. Exh. 5, Table A at 13 and 9. A 1968 Colorado report computes the Canon City annual average at 518,000 acre-feet for the years 1924-66. Jt. Exh. 92 at i. Another Colorado report done in 1975 estimates the 1935-50 average annual flow at 509,400 acre-feet, and the 1951-72 average at 513,600 acre-feet. Jt. Exh. 94 at 49. Transmountain imports increased in the later postcompact years.

in storage. Kansas estimated 60,445 acre-feet as the average annual amount of transmountain water delivered to the Colorado canal companies for irrigation use during the 1950-85 period. The best comparable Colorado estimate was 56,210 acre-feet. Colo. Exh. 846. Kansas makes no claim to this transmountain water. RT Vol. 11 at 127. It is specifically excluded from the Arkansas River Compact. Article III-B. Nonetheless, return flows from such imports still affect downstream flows and use.

Considering only native Arkansas River flows, that is, excluding transmountain imports, the mainstream supply does not show a significant historic decline. Declining flows at the Stateline cannot be explained by a comparable decrease in the mainstream inflow from the mountains. Colorado maintains, however, that the inflows from the tributaries have declined.

B. Stateline Flows.

The flow of the Arkansas River at the Colorado-Kansas Stateline is well gaged, and the states do not dispute these measured amounts. Colo. Exh. 4*, Table 5.8; Colo. Exh. 920. However, the gage measurements reflect total flows, including flood flows. Occasionally there are brief but high-intensity thunderstorms that produce large volumes of water which are not usable, but which nonetheless can significantly influence any simple arithmetical average. Moreover, the controlling provision in the Arkansas River Compact requires that upstream development shall not materially deplete the "usable quantity or availability" of water for use in Colorado or Kansas. Article IV-D. Thus Kansas' rights must ultimately be

judged in terms of usable flows, which were a major issue during the trial. However, for the purpose here of a general view of river supplies, unadjusted gage figures are used.

For the 1950-85 period, Stateline flows averaged 144,051 acre-feet per year. Colo. Exh. 4*, Table 5.8; Colo. Exh. 730. Colorado acknowledges that the Stateline flows have declined.[23] During the dry decade of the 1970s, flows averaged only 72,203 acre-feet annually. Colo. Exh. 4*, Table 5.8. The average for the last 20 year period which included wet years is still only 117,823 acre-feet. *Id.*, calculated for years 1966-85.

Earlier reports show considerably higher flows. For example, the Interim Report of the engineering committee prepared during the compact negotiations showed that Stateline flows averaged 280,800 acre-feet annually over the 1908-42 period. Jt. Exh. 5, Table D at 16. Even during an earlier dry decade, 1931-40, they averaged 146,200 acre-feet. *Id.* In a 1944 settlement plan proposed by C. L. Patterson, the Chief Engineer of the Colorado Water Conservation Board, average Stateline flows for 1908-38 were given as 260,700 acre-feet per year. Jt. Exh. 8 at 22. Colorado also submitted these same flow numbers

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[23] See the testimony of one of Colorado's chief experts at RT Vol. 114 at 115-16; also RT Vol. 115 at 73-76. Mr. Helton testified that the decline since 1950 was due to a combination of causes: a decrease in tributary inflow, an increase in consumptive use by phreatophytes, and "partly because of post-Compact well pumpage." RT Vol. 114 at 116. He agreed there was a "trend of increase in depletions to state line flows." RT Vol. 133 at 57-58.

to the Special Master in 1941 during earlier Supreme Court litigation. Kan. Exh. 379 at 2.

Similar figures were used in a 1961 Bureau of Reclamation Report for 1921-56 showing an average of 262,000 acre-feet annually. Colo. Exh. 113 at 6. According to a 1968 report prepared for the Colorado State Legislature, Stateline flows for 1924-42 averaged 194,000 acre-feet.[24] Jt. Exh. 91 at 10. A 1974 USGS report shows an annual average of 210,000 acre-feet for the years 1941-65. Jt. Exh. 78. In 1975 the Colorado Division of Water Resources issued a report which compared average Stateline flows for the periods 1935-50 and 1951-72, showing a decline from 280,900 acre-feet annually to 171,300. Jt. Exh. 94 at 49. Over the same periods, inflow at Canon City increased slightly. *Id.* After construction of John Martin Reservoir some decline in Stateline flows was to be expected. Kansas understood during the compact negotiations that it would get less total flow, but that its supplies would be better regulated and more usable. Kan. Exh. 129, Vol. II at 383.

C. Tributary Inflows.

One of the issues in the case is the extent to which tributary inflows to the mainstream have declined and thus may partially account for Stateline depletions. The issue is not easily resolved since the only tributaries that have been consistently gaged are Fountain Creek, and the

[24] This average excluded the extraordinarily high flows of 1942, which were estimated at more than 1.3 million acre-feet.

Apishapa and Purgatoire Rivers. These latter two tributaries drain about 4,429 square miles, but approximately 15,272 square miles lie within the drainage areas of the other tributaries. Colo. Exh. 4*, Table 1.2. During the trial Kansas attempted to estimate the ungaged tributary inflow by developing a rainfall-runoff model based on certain correlations, the output of which was fed into its integrated hydrological-institutional model. Colorado was critical of both the Kansas methodology and results, but used its own water budget analysis to develop ungaged tributary flows as the residual of the budget process. It is perhaps sufficient to note at this point in the Report that the states are in lively disagreement over the ungaged flow from the various tributaries.

D. Overappropriated Surface Supplies.

The surface flows of the Arkansas River in Colorado are greatly overappropriated, and decreed surface rights suffer frequent shortages. *Fellhauer v. People*, 167 Colo. 320, 447 P.2d 986 (1968); Jt. Exh. 157 at 9. Lands under a majority of the canals experience moderate to severe shortages of surface water after June, when the snowmelt is generally gone. Jt. Exh. 92 at i. In fact, the river was fully appropriated before the turn of the century, and in most years there is not enough water to provide a full irrigation season supply for any priority dates after 1880. RT Vol. 76 at 42-43, 108-09; Kan. Exh. 16; Jt. Exh. 105 at 34.

A Colorado expert witness also testified that the effective surface water supply in Colorado averaged 720,533 acre-feet annually during 1950-85. Colo. Exh. 727*; RT Vol. 116 at 33-35. These surface supply figures include tributary inflow as well as mainstream flows

from the Rocky Mountains, but do not include groundwater. The headgate diversion requirements of the Colorado canals for the same period were estimated at 1.18 million acre-feet per year. *Id.* Diversion requirements were based on a "full water supply," that is, the amount of water needed for "optimum crop production." RT Vol. 82 at 162. Colorado witnesses consistently characterized the system as being "water short." RT Vol. 82 at 46, 163; RT Vol. 116 at 34; RT Vol. 65 at 127, 147, 152; RT Vol. 71 at 81; RT Vol. 72 at 99-100; RT Vol. 76 at 42; RT Vol. 77 at 19.

When permitted by their priority rights, canal companies in Colorado frequently divert the full flow of the river. Canals with senior rights like Fort Lyon often "sweep the river," that is, take all the surface flow available at their headgates. RT Vol. 82 at 43; RT Vol. 66 at 129; RT Vol. 78 at 124. Surface flow must then be restored from return flows, precipitation, downstream tributary inflow, and releases from downstream storage. That becomes the supply for downstream users with later priorities. Diversion and rediversion of normal streamflows sometimes leaves long reaches of the river dry, or nearly so. Jt. Exh. 96, Vol. I at 25. One Colorado expert testified that basically all of the snowmelt is diverted or used in Colorado, either for irrigation or by phreatophytes and reservoir evaporation. RT Vol. 66 at 36-38, 41.

Following World War II, the development of new well technology (the high capacity turbine pump), together with the availability of cheap power, led to a great increase in the number of wells along the Arkansas River. Prior to 1957 a well could be drilled in Colorado without any kind of water right permit, and even after that time, the issuance of a permit was ministerial. Before

1965, a new well could not be denied on the basis of injury to prior vested rights. RT Vol. 76 at 25, 41, 100. Well pumping thus became the way to supplement inadequate surface supplies. And pumping from such postcompact wells became one of the principal issues in this case.

SECTION VII

MAJOR ISSUES AND CLAIMS OF THE PARTIES

There are two ultimate issues left to be decided in this Part I of the Report: (1) whether the increase in groundwater pumping in Colorado since the adoption of the Arkansas River Compact has violated the compact, and if so, to what extent; and (2) whether Colorado[25] has violated the compact through the implementation of the Winter Water Storage Program, and if so, to what extent. Kansas' claim arising from the operation of Trinidad Reservoir was dismissed earlier, subject to confirmation of the Court. A copy of that decision dated June 9, 1992 is included in this Report as Part III.

Colorado's two counterclaims, designated as the Lake McKinney Counterclaim and the Well Counterclaim, were also dismissed previously, subject to confirmation of the Court, by decisions dated April 20, 1992 and July 31, 1992. These decisions are included as Parts IV and V, respectively, of this Report.

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[25] The allegations in the amended complaint run against Colorado, although the WWSP is operated in Pueblo and John Martin Reservoirs, federal facilities, with the consent of the United States. The amended complaint actually refers to Colorado's rejection of the Arkansas River Compact Administration resolution of July 24, 1951, allegedly requiring that any reregulation of the native water of the Arkansas River be approved by the compact administration. I granted Colorado's motion for partial summary judgment on this legal issue, by order dated September 15, 1989 (Part II of this Report), but reserved for trial the factual issues "concerning any impact of the winter storage program on Kansas' entitlement under the Compact."

In its First Amended Complaint, Kansas also alleges that Colorado has failed and continues to fail to make deliveries of releases to which Kansas is entitled from John Martin Reservoir by an equivalent in Stateline flow, as required by Article V-E(3) of the compact, and in violation of Articles V-E(4) and V-H(2). However, these provisions were not separately addressed during the trial, apart from the overall claim of material depletions of Stateline flows caused by postcompact pumping and the WWSP.

More specifically, the major issues remaining and the claims of the parties are:

(1) *Burden of Proof.* Kansas states that this is a compact enforcement case, not an equitable apportionment proceeding, and that the ordinary preponderance of the evidence standard applies. Colorado and the United States, on the other hand, contend that the appropriate test is "clear and convincing proof."

(2) *Meaning of the Compact.* Kansas asserts that the compact achieves the equitable apportionment of the Arkansas River that was not made by the Supreme Court in the two prior interstate cases.[26] In the Kansas view, the essential apportionment provisions are: Article IV-D which preserves the usable flows that were available to Kansas at the time of the compact, as well as those which have or may become available as a result of the compact; and Article V which apportions the normal summer

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[26] *Kansas v. Colorado*, 206 U.S. 46, 51 L.Ed. 956, 27 S.Ct. 655 (1907); *Colorado v. Kansas*, 320 U.S. 383, 88 L.Ed. 116, 64 S.Ct. 176 (1943).

flows, and the new usable flows resulting from the construction and operation of John Martin Reservoir. It is the Kansas position that Article IV-D includes not only wells constructed after the compact, but also increased pumping from precompact wells. Colorado contends that the compact provides for a flexible and indeterminate apportionment based upon the right of both states to make demands for releases from John Martin Reservoir. With respect to wells with precompact dates of appropriation, Colorado asserts that Article VI-A(2) allows the amount of pumping to increase beyond precompact levels.

(3) *Equitable Defenses*. Colorado asserts that Kansas is subject to laches and related equitable defenses, and should be barred from complaining about the effects of well development which occurred in Colorado prior to 1965. In the alternative, Colorado asserts that this delay in complaining should "gravely add to the burden" that Kansas otherwise would bear, and must be weighed in considering the equities of the case. It is the Kansas position that laches does not apply as a matter of law in a case of this kind, and that it has not been established by the facts in any event. During argument on my Draft Report, Colorado contended that equity should at least preclude damages for any wrongful pumping prior to approximately 1975, although such argument did not include a bar to prospective relief.

(4) *1980 Operating Plan*. Colorado contends that the benefits accruing to Kansas under the 1980 Operating Plan approved by the Arkansas River Compact Administration should offset and bar any claim by Kansas for breach of the compact after 1980; moreover, that such benefits more than offset the impact of wells constructed

east of the Buffalo Canal headgate after 1965. During oral argument on my Draft Report, however, Colorado asserted that at the very least the 1980 Operating Plan should mitigate any damages for the period after 1980. Kansas argues that Article VI of the 1980 plan precludes these Colorado contentions; that Kansas' benefits under the 1980 plan were separately bargained for and may not be used to offset Stateline depletions; that Colorado also received substantial benefits under the plan; and that the plan goes beyond the legal authority of the compact administration and may not be relied upon by Colorado to defeat the Kansas claims. Moreover, Kansas argues that Colorado's position with respect to the 1980 Operating Plan would amount to an unlawful modification of the compact by the Arkansas River Compact Administration. Colorado responds that it does not claim that the compact can be altered without congressional approval, but rather that the voluntary conduct of Kansas may be considered in determining whether Kansas is entitled to enforce an equitable right or remedy.

(5) *Precompact Pumping*. Both states acknowledge that a certain amount of precompact pumping was "grandfathered" under the compact, and should not be considered in connection with the Kansas claim based on depletions caused by wells. Kansas conceded pumping of 11,000 acre-feet annually, that is, the amount of pumping which it estimated occurred in 1948. Colorado contends the Kansas figure is legally wrong, as well as being factually incorrect. Colorado instead adopted an approach based on claimed entitlements under Colorado law and Article VI-A(2) of the compact. The amounts of this claimed exempt pumping varied year by year, but

according to Colorado averaged 49,275 acre-feet over the 1950-85 period. If a single figure is to be used to represent precompact pumping, Colorado contends that early estimates used by the USGS and others are low, and that the amount should be on the order of 36,000 acre-feet annually. Both states agree that the entitlement of precompact wells is a legal question.

(6) *Total Amount of Pumping.* Both states estimated the amount of water pumped primarily through the use of electric power records, although pumping from non-electric wells (natural gas, diesel, etc.) was also calculated. Total pumping for the 1950-85 period was estimated by Kansas to be 5,810,000 acre-feet; the Colorado figure for the same period was 5,227,000 acre-feet.

(7) *Computer Modeling and Depletions from Pumping.* Much of the trial was spent in highly technical disputes among experts concerning the various computer models that were used to isolate and estimate the impacts of pumping and the WWSP. Kansas experts, after making substantial revisions to the original hydrologic-institutional model, estimated total depletions of usable Stateline flow for the 1950-85 period from both pumping and the WWSP at 489,000 acre-feet. Colorado and the United States subjected the reliability of the H-I model to relentless attack, criticizing not only the data and assumptions used in the model, but also its basic structure. The United States questions whether the revised H-I model results meet threshold standards for admissibility. Colorado's own combined groundwater models and water budget analysis, however, also show substantial Stateline depletions from pumping. Colorado contends that upstream of John Martin Reservoir these depletions have been largely

offset by return flows from transmountain imports, and downstream by benefits from the 1980 plan.

(8) *Usable Flow.* Article IV-D of the compact provides that future development or construction shall not materially deplete the waters of the Arkansas River "in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact." Kansas presented evidence on three alternate methods to reduce depletions of total Stateline flow to depletions of usable flow. Colorado experts raised objections to each, offered changed values for one methodology if it were to be used, but presented no usable flow analysis of their own after 1969.

(9) *Well Development in Kansas.* Colorado contends that Kansas' "predicament" is largely due to its own failure to regulate postcompact pumping in Kansas. The issues are whether pumping in Kansas affects water that comes within the provisions of the Arkansas River Compact, and whether users in Colorado are adversely impacted within the meaning of the compact by such postcompact pumping in Kansas.

(10) *Winter Water Storage Program.* The fundamental issue is whether the WWSP, which operated during 1976-85 except for 1978, caused material depletions of usable Stateline flow. Kansas claims that such depletions amounted to 40,000 acre-feet over the whole period of time. Both the United States and Colorado dispute this figure, claiming that the results of Kansas' modeling effort are not accurate or reliable, and that the program increased Stateline flows if accretions are considered. As subsidiary issues, Kansas maintains that Colorado used

the wrong period of time during which to analyze the program. Colorado simulated operation of the WWSP over the historic period of 1950-75. It did not analyze the program for the years when it was actually operated. Kansas, on the other hand, examined the years of actual operation, but assumed that the 1980 Operating Plan was not in effect during 1980-85. Both the United States and Colorado objected to this assumption. Finally, Colorado urges that Kansas has acquiesced in the development and implementation of the WWSP, and should not now be heard to complain.

SECTION VIII

BURDEN OF PROOF

A. The Issue.

There is no question of course that Kansas, as plaintiff, must prove its case. There is a serious question, however, concerning the relative weight of evidence which Kansas must produce to satisfy that requirement. Specifically, Kansas contends that it need meet only the "preponderance of the evidence" test applicable to ordinary civil litigation. Colorado and the United States, on the other hand, contend that the appropriate test is "clear and convincing proof." This controversy may be important because of the many factual issues in the case, especially the issues surrounding Kansas' effort to construct a computer model of the Arkansas River system and to demonstrate Stateline depletions through the use of that model.

B. Nebraska v. Wyoming.

Although it may be only dictum, the Supreme Court's unanimous decision last year in *Nebraska v. Wyoming*, 507 U.S. ___, 123 L.Ed.2d 317, 113 S.Ct. 1689 (1993), is so recent and so relevant that I necessarily take it as the starting point in determining the burden of proof Kansas faces in the present case. The Court has again stated its long-standing rule that in litigation within the original jurisdiction, a state seeking equitable apportionment of an interstate stream must present clear and convincing proof of some real and substantial injury or damage. (507 U.S. at ___, 123 L.Ed.2d 317 at 329, 113 S.Ct. 1689 (1993)

citing *Idaho v. Oregon*, 462 U.S. 1017, 1027, 77 L.Ed.2d 387, 397, 103 S.Ct. 2817 (1983); *Colorado v. Kansas*, 320 U.S. 383, 393, 88 L.Ed. 116, 123-24, 64 S.Ct. 176 (1943); *Connecticut v. Massachusetts*, 282 U.S. 660, 669, 75 L.Ed. 602, 607, 51 S.Ct. 286 (1931).

The *Nebraska* case involves a new refinement of the rule. The opinion states that where a Supreme Court decree has been issued in an interstate river apportionment case, a state instituting a later proceeding to *enforce* the decree need not meet the strict standard of proof applicable in the initial proceeding. 507 U.S. at ___, 123 L.Ed.2d at 330-31, 113 S.Ct. 1689 (1993). On the other hand, a high degree of proof will still be required of a party asking to *modify* such a decree, since a state proposing modification "essentially seeks a reweighing of equities and an injunction declaring new rights and responsibilities." *Id.* A resulting question addressed in the latest briefs in our own case is whether or not the Arkansas River Compact is analogous to a Supreme Court decree, so that Kansas' suit may be viewed as one to enforce the compact and therefore as a proceeding subject to a less demanding evidentiary test than clear and convincing proof.

C. Background.

In approaching this issue, two background matters should be noted.

First, what the Court in the *Nebraska* case refers to as the "legal standard" for litigation between states (that is, the requirement that the complaining state present clear and convincing evidence) is a latecomer on the scene. For

over a century following ratification of the constitution, the Court does not appear to have adopted any burden of proof rule applicable to all state-vs-state cases. In a number of the opinions in that period the Court commented on the strong showing required of a given state, but such remarks involved either particular types of disputes, e.g., *Virginia v. West Virginia*, 78 U.S. (11 Wall.) 39, 63, 20 L.Ed. 67, 73 (1871) (state action based on local election), or cases where the showing of an opposing state was especially strong so that the burden of proof was not significant. E.g., *Rhode Island v. Massachusetts*, 45 U.S. (4 How.) 591, 638, 11 L.Ed. 1116, 1137 (1846) (boundary); *Indiana v. Kentucky*, 136 U.S. 479, 518, 34 L.Ed. 329, 336, 10 S.Ct. 1051 (1890) (boundary); *Virginia v. Tennessee*, 148 U.S. 503, 523, 37 L.Ed. 537, 544, 13 S.Ct. 728 (1893) (boundary). *Missouri v. Illinois*, 200 U.S. 496, 521, 50 L.Ed. 572, 579, 26 S.Ct. 268 (1906), appears to be the first case to articulate this strict rule. Justice Shiras' 1901 opinion overruling the demurrer (180 U.S. 208, 248, 45 L.Ed. 497, 515, 21 S.Ct. 331) mentioned in dictum that, because Missouri sought an injunction based on nuisance, the evidence would have to be "determinate and satisfactory." But in 1906, after evidence was presented, Justice Holmes referred back to the Shiras "intimation" (200 U.S. at 518, 50 L.Ed. at 577) and went on to announce a burden of proof rule applicable generally to actions between states – "clearly and fully proved." 200 U.S. at 521, 50 L.Ed. at 579.

In hindsight, it is fair to observe that the evidence of river contamination in *Missouri v. Illinois* was very complex and controversial, and that it required no special burden of proof to deny relief. Nor was it necessary to state a rule going beyond the nuisance context. Moreover,

the only citation given in support of the new standard was the ruling on demurrer in *Kansas v. Colorado*, 185 U.S. 125, 46 L.Ed. 838, 22 S.Ct. 552 (1902), an opinion which did not make that point. And following trial, the final opinion in *Kansas v. Colorado*, 206 U.S. 46, 51 L.Ed. 956, 27 S.Ct. 655 (1907), also omitted reference to a strict burden of proof. Instead (206 U.S. at 97, 51 L.Ed. at 975), Justice Brewer stressed the equality of the two states:

> "One cardinal rule, underlying all of the relations of the states to each other, is that of equality of right. Each state stands on the same level with all the rest."

See also *Connecticut v. Massachusetts*, 282 U.S. 660, 670, 75 L.Ed. 602, 607, 51 S.Ct. 286 (1931).

Later litigation involving sewage and drainage (*New York v. New Jersey*, 256 U.S. 296, 309, 65 L.Ed. 937, 943, 41 S.Ct. 492 (1921); *North Dakota v. Minnesota*, 263 U.S. 365, 374, 68 L.Ed. 342, 345-46, 44 S.Ct. 138 (1923)), echoed the rule of *Missouri v. Illinois*, and by the time of *Colorado v. Kansas* in 1943 there was a line of similar precedents. 320 U.S. at 393, note 8, 88 L.Ed. at 124. The rule is now "longstanding." Yet there has been no real explanation of the suitability of a strict burden of proof for equitable apportionment cases.

Second, on an interstate stream, the downstream state will normally be the complaining party. As such it will also invariably be the party which is required to present a very strong case in order to obtain relief. In contrast to actions involving private water rights, the Court's special rule for burden of proof in equitable apportionment cases adds a significant legal inequality to

the natural inequality already imposed by geography. The ideal of federalism – that each state is on an equal footing with all the other states – seems poorly served by a rule which routinely penalizes all downstream states.

D. The Compact.

These background matters aside, I can see no reason why an interstate compact should have any less standing in this respect than a decree of the Court. It is often said that the Court's authority over the states is a substitute for the war and treaty powers which they possessed before adoption of the constitution (*Rhode Island v. Massachusetts*, 37 U.S. (12 Pet.) 657, 725, 9 L.Ed. 1233, 1260 (1838); *Kansas v. Colorado*, 185 U.S. 125, 140, 46 L.Ed. 838, 844, 22 S.Ct. 552 (1902); *North Dakota v. Minnesota*, 263 U.S. 365, 372-73, 68 L.Ed. 342, 345, 44 S.Ct. 138 (1923); *Idaho v. Oregon*, 462 U.S. 1017, 1031, note 1, 77 L.Ed. 2d 387, 400, 103 S.Ct. 2817 (1983)), but the compact alternative is no less effective a substitute for those powers and clearly is no less constitutionally authorized. A compact is approved by the legislatures of the affected states and by Congress. Indeed, the Court itself has frequently urged contending states to negotiate compacts *rather than* resorting to the jurisdiction of the Court. See *Colorado v. Kansas, supra*, 320 U.S. 383, 392, 88 L.Ed. 116, 123, 64 S.Ct. 176 (1943); *New York v. New Jersey*, 256 U.S. 296, 313, 65 L.Ed. 937, 945, 41 S.Ct. 492 (1921). Undoubtedly one reason for that admonition is that the compact procedure provides an important ingredient which the Court itself cannot provide – the consent of all the parties. Both Colorado and Congress consented to the rights and duties set forth in the compact; neither may now be heard

to claim that those rights and duties ought to be harder to enforce than they would be if contained in a decree of the Court.

E. "Enforcing" the Material Depletion Standard.

The Court's detailed discussion in *Nebraska v. Wyoming* indicates a willingness to consider individual provisions of the decree in terms of this enforcement-vs-modification analysis. 507 U.S. at ___, 123 L.Ed.2d at 330, 113 S.Ct. 1689 (1993). The decree in that case was much more detailed in its statement of rights and duties than the more general provisions of the Arkansas River Compact, but, as I conclude in my discussion of Article IV-D of the compact, I believe the agreed concept of material depletion is a meaningful and practical standard for dividing the resources of the river. Just as with a preexisting decree of the Court, the rights and duties stage of this dispute has been concluded; the present proceedings involve enforcement of those rights and duties.[27] Accordingly, the burden of proof which Kansas must now satisfy is the traditional one of ordinary civil litigation, that is, preponderance of the evidence.

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[27] The Supreme Court has jurisdiction to enforce an interstate compact, as well as to declare rights under the compact and to determine compliance. *Texas v. New Mexico*, 462 U.S. 554, 567, 575-76, 77 L.Ed. 2d 1, 103 S.Ct. 2558 (1983).

SECTION IX

BACKGROUND OF THE COMPACT

The meaning of the Arkansas River Compact cannot be fully understood apart from the rich history of controversy over the river, and the early efforts to apportion its waters between the two states. Nor can its meaning be divorced from the views of men in both states who fought the apportionment issues for more than a decade before taking seats on the compact commission to undertake formal compact negotiations.

The compact makes no specific quantitative allocation of river flows, either in amounts or in terms of shares in the supply. It does not specify how flows had been divided and used in the past. Nor does it make specific reference to the pumping of tributary groundwater from wells. And yet the compact relies upon continued agreement between the states in administering the compact to achieve its stated purpose, that is, to "Equitably divide and apportion" the river flows and the benefits arising from John Martin Reservoir. Article I-B. Under these circumstances, and as a supplement to the compact language and the record of compact deliberations, the background history becomes highly useful in helping to understand the intent of the compact commissioners. Certainly the compact was in part shaped by this history.

Kansas' first witness during the trial was Douglas R. Littlefield, Ph.D., a research historian and consultant. His qualifications, including numerous publications and awards, are set forth in Kansas' Exhibit 484. Dr. Littlefield began his work for Kansas in the spring of 1986. The result of that effort was a 462-page, two-volume report

entitled "The History of the Arkansas River Compact." Kan. Exh. 129. His review encompassed hundreds of thousands of pages of archival material.[28] Dr. Littlefield

[28] The sources are described generally as follows: "Comprehensive research was undertaken at the National Archives (Washington, D.C.) in the records of the Bureau of Reclamation, the U.S. Geological Survey, the Department of the Interior, the U.S. Supreme Court, the Natural Resources Planning Board, and the Federal Power Commission. Other work was done at the Federal Records Center in Houston, Texas, in the records of the U.S. Army Corps of Engineers. Further research was conducted in the Kansas State Historical Society (Topeka) in the Kansas governors' papers between 1900 and 1950, in the personal papers of Congressman Clifford R. Hope (who represented western Kansas between 1927 and 1957), in the records of the Kansas State Board of Agriculture's Division of Water Resources, and in the Kansas attorney general's files (including the attorney general's records relating to *Colorado v. Kansas*). Additional work was undertaken at the Colorado Historical Society (Denver) in the records of the Arkansas Valley Ditch Association (which represented water users in Colorado's part of the river basin) and in the Michael C. Hinderlider Papers. (Hinderlider was Colorado's state engineer during much of the period under study.) Work was also done at the presidential library of Franklin D. Roosevelt in Hyde Park, New York, and in the presidential library of Harry S. Truman in Independence, Missouri. Research was also carried out at the University of Colorado (Boulder) in the personal papers of U.S. Senator Gordon L. Allott and Congressman Edgar J. Chenoweth, both from Colorado. (Allott was a prominent attorney from southeastern Colorado who served in the U.S. Senate from 1955 to 1973, and he was a law partner with Arthur C. Gordon, who represented the Fort Lyon Canal Company, a major Arkansas River water user. Gordon also served as a special assistant attorney general in *Colorado v. Kansas*. Chenoweth represented southeastern Colorado in the House of Representatives from 1941 to 1949 and again from 1951-1965.) Further archival work was undertaken in the files of the Arkansas River Compact Administration (the organization created by the compact to administer the agreement's daily operation) in Lamar, Colorado.
"In addition to research in these historical archives, more document review and analysis was done at Bureau of Reclamation's offices in Colorado, in Montana, and in Washington, D.C., and research was undertaken in Kansas state government offices in Topeka and Garden City. Finally, research was also conducted in many published primary sources, including Congressional reports and various state government publications." Kan. Exh. 129 at 12-13.

was on the witness stand for some twelve days, including extensive cross-examination. While Colorado disagrees with some of his conclusions, and while some of his opinions were stricken as legal conclusions, I believe that the accuracy and thoroughness of his historical presentation generally hold up well. Colorado offered no historical expert in opposition.

A. Early History.

Following Kansas' failure to gain more water from Colorado in the 1907 Supreme Court decision,[29] a number of private actions were filed against users in Colorado. One of these filed in 1910 by a Kansas plaintiff sought a

[29] *Kansas v. Colorado*, 206 U.S. 46, 51 L.Ed. 956, 27 S.Ct. 655 (1907).

decree establishing the priorities of individual diverters along the Arkansas River regardless of the boundary between the states.[30] The objective of this action contrasted sharply with the equitable apportionment between the two states sought earlier by the State of Kansas. The case was settled in 1916, giving the various Kansas ditches specific diversion rights with a priority date of 1910, the year the action was filed. Kan. Exh. 141. The various Kansas ditches had actually begun to take water in 1879 and in the early 1880s. Kan. Exh. 129, Vol. I at 37. However, the settlement essentially confirmed the use of water in the two states as it then existed. Future appropriations in Colorado were subordinated to the rights of the Kansas diverters. The Purgatoire River was then relatively unappropriated, and so future Colorado interference with that source of supply was checked. *Id.* at 36.

This settlement was rejected by Kansas' Finney County Water Users' Association (Farmers' Ditch), and in 1916 it filed its own action against Colorado users. The litigation was later expanded to include tributary users, and testimony was heard throughout the early 1920s. In 1921 another settlement approach was made. This stemmed from a letter from Delph E. Carpenter, a highly respected Colorado water lawyer, to the Kansas Attorney General. Carpenter proposed negotiating an interstate compact so that both the states and their users would be

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30 *United States Irrigating Co. v. Graham Ditch Company, et al.*, Case 5578, U.S. District Court for District of Colorado; Kan. Exh. 129 at 33-34.

bound. As a result, both states passed legislation authorizing the appointment of a commission to negotiate a compact. Carpenter represented Colorado, and Kansas named George S. Knapp, who later became the Kansas Chief Engineer and head of its Division of Water Resources. Some 20 years later Knapp was to become the chairman of the Kansas delegation that actually negotiated the Arkansas River Compact. By 1925 Carpenter and Knapp had drafted a tentative compact which was submitted to irrigation interests in both states for their comments and recommendations. Kan. Exh. 144.

The proposed compact recognized that virtually all of the normal flows of the mainstem (not including irregular flood flows) were being diverted by Colorado ditches. It did not attempt to change that situation, and thus Colorado farmers would have assurances that their existing uses would not be subject to continued legal threats. As for Kansas' irrigation problems, Knapp and Carpenter tried to find a remedy through use of water from the Purgatoire River. Kansas was given the right to build a major reservoir on the Purgatoire in order to store up to 120,000 acre-feet of water. With certain minor exceptions, Kansas would have the right to this stored water, but subject to a reservation in favor of Colorado of 10,000 acre-feet for users in the Arkansas River Valley. Kan. Exh. 129, Vol. I at 42-43. However, according to Knapp, this reservation had been inserted for discussion purposes only and Knapp opposed it. *Id.* at 44. Whether as a result of this issue or not, the proposed compact went no further. Meanwhile the Finney County Water Users Association lawsuits continued to move ahead at a slow pace.

In 1928, therefore, the State of Colorado brought an action in the United States Supreme Court to enforce the earlier judgment in *Kansas v. Colorado*, and to halt the prosecution of the private litigation. That case was ultimately decided by the Court in *Colorado v. Kansas*, 320 U.S. 383, 88 L.Ed. 116, 64 S.Ct. 176 (1943).

B. Development of Caddoa Reservoir.[31]

The historic 1921 flooding of the Arkansas River, which caused extensive damage from Pueblo to Garden City, became the catalyst for yet another approach to solving the water problems of the two states.[32] The Colorado State Engineer, Michael C. Hinderlider, proposed the possibility of a reservoir on the mainstream near Caddoa. Hinderlider saw this facility as serving the dual purpose of flood control and also possibly helping to solve the interstate struggle over allocation. Colorado began preliminary studies on its own, but also sought federal involvement and support.[33] In the same general time frame, Colorado officials and water users were also

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[31] Named for the small town of Caddoa, Colorado, where the reservoir was proposed to be located. In 1940 the name was changed to John Martin Reservoir in memory of the Congressman who represented southeastern Colorado from 1909 to 1913 and again from 1933 to 1939, and who was highly influential in obtaining federal authorization and funding for the reservoir. Congressman Martin died in 1939. Kan. Exh. 208, Consent Decree at 5.

[32] See pages 47-49 of Kan. Exh. 129, Vol. I, for photographs of the 1921 flood damage.

[33] Colorado's Caddoa Dam survey was completed by Hinderlider in 1928. Kan. Exh. 129, Vol. I at 53.

exploring additional transmountain diversions in order to augment their irrigation supplies.[34] To some extent, these transmountain plans competed with the Caddoa project for support and funding.

Efforts to obtain federal funding for the Caddoa project were marshalled through a Caddoa Dam Committee organized in 1933. This committee included not only high ranking Colorado officials but also influential representatives of water users. Among these was Henry C. Vidal, a Denver lawyer who represented the Arkansas Valley Ditch Association. Vidal was also one of Colorado's attorneys in *Colorado v. Kansas*, and later became chairman of the Colorado delegation to the commission that negotiated the Arkansas River Compact.

The committee recognized that federal aid was unlikely unless the Caddoa project also had Kansas' support. Kan. Exh. 129, Vol. I at 64-66. Negotiations with Kansas were again resumed. Colorado representatives were prepared to give assurances that the new reservoir could not be used to bring new lands under irrigation.[35]

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[34] That effort eventually led to the Bureau of Reclamation's Fryingpan-Arkansas Project in 1962. Public Law 87-590, 87 Cong., 2d Sess. (Aug. 16, 1962), 76 Stat. 389.

[35] A 1933 report by Hinderlider stated that about 325,000 acres in Colorado were irrigated from the Arkansas River downstream of Pueblo. Kan. Exh. 162. He put the Kansas acreage at approximately 65,000 acres. *Id.* A report from the Kansas Attorney General to the Governor, also in 1933, estimated that Kansas ditches had been receiving on average about 60,000 acre-feet of water annually from the river to irrigate 70,000 acres of land. Kan. Exh. 155. Knapp understood, however, that a prohibition against new irrigated acreage would not necessarily limit water

Kan. Exhs. 150, 153, 163-65, 129 at 78-79. But Kansas was seeking more, namely, a definite allocation of the flows below the reservoir. Kan. Exhs. 153, 157, 158. A tentative accord acceding to Kansas' demands was reached at a September, 1933 meeting in Wichita. Principal participants at this meeting included Vidal, Knapp and C. L. Patterson who later became the Chief Engineer for the Colorado Water Conservation Board. Patterson, along with Vidal and Knapp, was also appointed later to the negotiating commission for the Arkansas River Compact. After further negotiations, the agreement was finalized in writing on December 18, 1933.

C. Stipulation of 1933.

The agreement of December 18, 1933 was drafted in the form of a stipulation to be filed in the pending *Colorado v. Kansas* litigation. Kan. Exh. 167. However, the stipulation was not to be filed until construction of Caddoa Dam and Reservoir was assured. Each state pledged to use its influence so far as practicable to obtain construction of the reservoir by the United States, and the water allocation provisions of the stipulation were to become effective only when Caddoa Dam had been constructed and water was stored in the reservoir. *Id.* at 3, 5.

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use in Colorado. He noted that water use could be increased through wells. Moreover, many farmers in Colorado did not have sufficient water to irrigate all of their land each year. Consequently one field would be watered one year and another the next. If water could be obtained, the amount of land actually irrigated in any given year could be increased without showing any increase in "irrigated acreage." Kan. Exh. 205.

The stipulation was also made without prejudice to the claims of either state in *Colorado v. Kansas*, and was specifically made subject to the decision of the Supreme Court in that case. *Id.* at 5.

The stipulation provided that construction and operation of Caddoa should not "disturb the status quo of the diversion of water for beneficial uses from said Arkansas River by the ditches and canals now constructed and operated in both of the States of Colorado and Kansas." *Id.* at 3. In order to "maintain the status quo," Kansas was allocated 77,000 acre-feet annually at the Stateline. 52,000 acre-feet were to be delivered during the irrigation season from April 1 to October 1, with the remaining 25,000 acre-feet being delivered during the nonirrigating season. *Id.* at 3. For the irrigation of lands in Colorado located below the reservoir, 160,000 acre-feet annually were allocated to Colorado. These allocations applied to the normal flows of the Arkansas River that were to be released through the new reservoir, and corresponded generally to the amounts of water that had been used. Kan. Exh. 129, Vol. I at 83-84. Any shortages were to be prorated between the states in proportion to their respective allocations. The "additional water" to be stored in the reservoir was said to constitute "surplus" and was allocated one-half to Colorado and one-half to Kansas. Kan. Exh. 167 at 4. Release of such stored water was not considered part of the specific acre-feet allocations made to the states.

Caddoa Dam and Reservoir were authorized by Congress in 1936, and full funding for the project was provided in 1938. Kan. Exhs. 182, 183, 129, Vol. I at 106-07.

D. Proposed Consent Decree in Colorado v. Kansas.

Despite the cooperative efforts between the states in support of the Caddoa project, proceedings in *Colorado v. Kansas* continued to move slowly. Testimony was taken from 1932 to the end of 1939.[36] Kan. Exh. 129, Vol. I at 122, 125. In 1937, however, counsel for the two states, A. W. McHendrie for Colorado and W. E. Stanley for Kansas, began to discuss settlement. McHendrie initially proposed a consent decree in the Supreme Court action based upon the stipulation of 1933. *Id.* at 126. McHendrie thought that such a settlement would be fair and would give the Kansas ditches ". . . a controlled supply of water equal to that which they had been getting throughout their history." *Id.* at 127.

Stanley, however, believed that the 1933 stipulation was only an interim measure and that Kansas was entitled to larger flows under any permanent settlement. He wanted to see the 77,000 acre-feet allocation in the 1933 stipulation increased to 100,000 acre-feet. Nonetheless, negotiations proceeded and ultimately the settlement assumed a different form. Based on agreement among counsel, McHendrie and Henry C. Vidal in 1941 prepared a Stipulation and Final Decree, generally referred to as a Consent Decree, to be filed in the Supreme Court proceedings. Kan. Exh. 208.

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[36] The record consisted of 36 volumes of testimony and some 316 exhibits. Kan. Exh. 129, Vol. I at 125.

The proposed decree provided that Kansas would get 25% of the streamflows of the Arkansas and Purgatoire Rivers between April 1 and September 30, as measured near Parkdale, Colorado (above Pueblo at the head of Royal Gorge), and at the mouth of the Purgatoire. This share of river flow was in contrast to the acre-foot allocation included in the 1933 stipulation, although Littlefield testified that the 25% figure was in fact based upon the amounts that had been flowing into Kansas. RT Vol. 4 at 46. Measuring the Kansas share upstream protected it against intervening development and served the same purpose as the guaranteed amount under the 1933 stipulation. Any imported water was not to be counted in determining the Kansas share.

During winter months, Kansas was to have 25% of the total flows up to 25,000 acre-feet, plus water for storage at Lake McKinney. Kansas could elect to store any of its waters at John Martin Reservoir, provided that it did not use more than one-third of the total conservation pool. The Kansas allocation was measured at the State-line, subject to certain corrections. Flows over 2,000 cfs, and volume of more than 25,000 acre-feet in any winter season, were considered "undivertible" and were not chargeable against Kansas.

Although the proposed consent decree had been prepared by Colorado's attorneys in *Colorado v. Kansas*, and was quickly approved by the Finney County Water Users' Association and Kansas' Associated Ditches, it was opposed by C. L. Patterson, the Chief Engineer for the Colorado Water Conservation Board. Patterson prepared an extensive analysis, including a great deal of water supply and usage data, which is in evidence as Kansas

Exhibit 208. A copy of the proposed consent decree is attached to Patterson's analysis. Essentially, Patterson believed that the consent decree awarded too much water to Kansas, and would require existing Colorado uses to be cut back. Kansas, he thought, would be assured of "largely increased supplies of usable water" and "all the conservation benefits of Caddoa Reservoir." Kan. Exh. 208 at 3, 5. On the other hand, it would "require limitations upon diversions and uses heretofore and now being made by Colorado appropriators." *Id.* at 5.

Patterson noted that the allocation in the 1933 stipulation, in contrast, "will not disturb the status quo of diversions in either State." *Id.* at 9. The 1933 stipulation also divided the quantities of water conserved from streamflows previously wasted, "in addition to the supplies required to maintain the status quo of downstream diversions." *Id.* at 10. Patterson maintained that during the 1908-38 period, ditch diversions in Kansas averaged 84,500 acre-feet per year. *Id.* at 36. He noted that these historical averages were approximately the same, although slightly greater than the "status quo" values used in the 1933 stipulation. *Id.* For this same 1908-38 period, his data indicated that 740,000 acre-feet, or 74% of the total water available, was consumptively used in Colorado.

Based upon Patterson's views, the Arkansas Valley Ditch Association in Colorado rejected the proposed settlement. This action was taken despite strong support from Henry C. Vidal in favor of the proposed consent decree. Kan. Exh. 209. Vidal pointed out that the Supreme Court proceedings involved a determination of the

respective rights of the two states in the equitable benefits of the Arkansas River, "whether measured by actual quantities of water or otherwise . . ." *Id.* at 3. More than a mere division of benefits of Caddoa Reservoir was involved. In his opinion, the proposed consent decree was "the most favorable Colorado can get and should be approved." *Id.* at 8.

While the Arkansas Valley Ditch Association in Colorado rejected Vidal's recommendation, it still encouraged talks to continue toward a more acceptable decree. As a result, Colorado officials met again in March, 1942. Those present included Colorado Governor Ralph Carr; Attorney General Gail Ireland; Colorado Water Conservation Board Director Clifford H. Stone; Stone's legal counsel, Jean S. Breitenstein; Stone's Chief Engineer, Charles Patterson; and Attorneys Arthur Gordon, A.W. McHendrie, and Henry Vidal. All except the Governor were subsequently involved in the compact negotiations, either as commissioners or as advisors.

Negotiations were in fact renewed. Colorado pressed for modifications in the consent decree, lowering the amount of storage capacity in John Martin Reservoir used by Kansas, and seeking the right of Colorado to construct additional reservoirs upstream from John Martin, subject to protections for Kansas. Kan. Exh. 212. However, the changes were not acceptable to Kansas. Kan. Exh. 213. A final effort at settlement was then made by Patterson, who developed a proposal known as "Patterson's Plan F." Kan. Exh. 214. Plan F still dealt with apportionment of the flows historically diverted in the two states, together with a division of the flows to be conserved by John Martin. Kan. Exh. 129, Vol. I at 153-158. However, this plan also

was rejected by Kansas. *Id.* at 159. Under Plan F, Stateline flows in excess of 2,000 cfs during the summer, or 40,000 acre-feet per month, or 160,000 acre-feet per season, were not considered usable and were not charged against the Kansas allocation. *Id.* at 157. As to further upstream development in Colorado, Plan F provided that:

> "[E]nterprises constructed in Colorado in the future shall not divert or store waters of the interstate stream under priorities or decrees dated hereafter except at such times as the conservation pool in Caddoa Reservoir is filled to within 40,000 acre feet of its water holding capacity . . ." *Id.* at 158.

E. The Supreme Court Decision in Colorado v. Kansas.

Time finally ran out on the efforts to agree upon a consent decree. Charles L. Cavanah, the Special Master appointed to hear the case, made his recommendations to the United States Supreme Court on May 1, 1943. Kan. Exh. 215. In a cryptic series of findings without discussion of the evidence, the Special Master found that the "average annual dependable and fairly continuous water supply" of the Arkansas River and its tributaries amounted to 1,110,000 acre-feet. *Id.* at 10. Of this flow, he awarded 925,000 acre-feet to Colorado, and 185,000 acre-feet to Kansas. *Id.* at 11-12. When flows either exceeded or fell short of the dependable average, the allocations were to be prorated. Both states filed exceptions to the Master's recommendations. Kansas was ready to accept the 185,000 acre-feet per year allocation since it was well beyond what had been sought in previous negotiations.

Nonetheless, Kansas objected to its inability to obtain water when the users demanded it. Colorado, as might be expected, objected to the basic apportionment itself and argued that the proposed allocation would cause serious damage to its interests.

The Court found that the Master had erred in attempting to divide what he designated as the "average annual dependable" water supply. Kan. Exh. 216 at 392. The Master did not define floodwaters or the extent to which they were unusable by either state. Nor did the Master suggest any provision whereby the occurrence of floodwaters could be taken into account in defining Colorado's obligation to deliver water to Kansas. *Id.* at 390. The critical matter, said the Court, is:

> ". . . the amount of divertible flow at times when water is most needed for irrigation. Calculations of average annual flow, which include flood flows, are, therefore, not helpful in ascertaining the dependable supply of water usable for irrigation." *Id.* at 397.

Of more importance, the Court found that Kansas had not sustained its allegations that Colorado's use of water had materially increased, and that the increase had worked a serious detriment to the substantial interests of Kansas. *Id.* at 400. While the Master had found a material increase in river depletions by Colorado, his report did not state what he considered material, or the extent of the diminution of flow, or the interests of Kansas which had been injured and the extent of the injury. In reviewing the evidence, the Court found that it did not support a depletion in *usable* flows. *Id.* at 396, 398. The Court noted that the Kansas ditches were capable of diverting water only

up to 2,000 cfs. *Id.* at 396. Pointing out that irrigated acreage in Kansas had also increased, the Court did not find the requisite showing of serious injury. The Court mentioned the "great quantities of ground water" available in Kansas, but did not discuss the source or replenishment of such groundwater, nor any consideration of overdraft. *Id.* at 399.

Except to enjoin further proceeding in the private litigation, the Court denied relief.[37] Perhaps quietly recognizing that the maximum benefits from John Martin could be realized only by agreement, the Court directed the states back to the compact approach:

> "Such [interstate water] controversies may appropriately be composed by negotiation and agreement, pursuant to the compact clause of the Federal Constitution. We say of this case, as the court has said of interstate differences of like nature, that such mutual accommodation and agreement should, if possible, be the medium of settlement, instead of invocation of our adjudicatory power." *Colorado v. Kansas*, 320 U.S. 383 at 392.

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[37] According to one of the recitals in the proposed consent decree, Colorado in its bill of complaint had sought an "equitable apportionment and division of the benefits of the water of said Arkansas River and its tributaries . . . ." Kansas filed an answer and cross-bill for a determination of its share of the total water supply to be delivered at the Stateline. Kan. Exh. 208, Decree at 3.

F. Interim Operating Agreements, 1943-47.

By December of 1942, the year before the Supreme Court decision in *Colorado v. Kansas*, construction of John Martin Reservoir had proceeded far enough to allow limited conservation storage to begin. By March, 1943 some 40,000 acre-feet were in storage. Kan. Exh. 129, Vol. I at 168. Absent an agreement between the states, the Corps of Engineers intended to release this water. Responding to this pressure, Knapp and Hinderlider met with the Corps to discuss rates of release and a division of the stored water between Colorado and Kansas. By April 1943 the states agreed that the 1933 stipulation had become effective, since *Colorado v. Kansas* had not yet been decided. *Id.* at 170. Water then in storage was considered as direct streamflow and was divided 67.5 percent to Colorado and 32.5 percent to Kansas. Kan. Exh. 217.

In the following years until adoption of the Arkansas River Compact, additional agreements were made. The 1933 stipulation expired by its terms when the Supreme Court decision in *Colorado v. Kansas* was issued in December 1943. Subsequent agreements were often difficult to reach, but without agreement the parties were under threat that the Corps would simply release water from John Martin Reservoir, or even refuse such storage. The various proposals, negotiations and interim agreements are discussed in detail in Kan. Exh. 129, Vol. I at 162-215.

At times negotiations were in the hands of many of the leaders who later became compact commissioners.[38] At one time, when negotiations stalled, the two governors stepped in. Patterson, Vidal and Ireland all had separate plans, but none were acceptable to Kansas. The agreement for 1944-45, at the suggestion of Knapp, was finally patterned after the 1943 agreement. One-half of the water in storage was allocated to Kansas, together with the return flows and tributary inflow originating below John Martin Reservoir. Kan. Exh. 129, Vol. I at 200.

The last of these interim agreements was negotiated by William E. Leavitt (for Kansas) and H. B. Mendenhall (for Colorado). *Id.* at 210. Both of these men had been appointed as compact commissioners, and the compact negotiations were then underway. The Leavitt-Mendenhall accord provided that winter storage would begin November 1, 1946 and last until April 1, 1947. During this period of time, ditches in Colorado could call for water to be released from John Martin Reservoir for winter irrigation at flows not to exceed 100 cfs. However, any such winter releases were deducted from Colorado's share of summer storage releases. With some variations, stored waters were basically apportioned 600 cfs to Colorado and 400 cfs to Kansas. This ratio represented an adjustment from the traditional 67.5/32.5 division first established in the 1933 stipulation and used in earlier interim

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[38] In the spring of 1944, Attorney General Mitchell, Knapp and Roland H. Tate, the attorney for the Kansas Associated Ditches, were all involved on behalf of Kansas. For Colorado, their representatives included Attorney General Gail Ireland, Patterson and Vidal. All six of these persons became compact negotiators. Kan. Exh. 129, Vol. I at 176.

operating agreements. It was noted by Hans Kramer, the federal delegate to the compact deliberations, that the modification had been made at the suggestion of Charles Patterson to compensate for increased diversions in Colorado beyond the de facto status quo of 1943. *Id.* at 212-13.

The summer portion of the 1947 operating agreement provided that between April 1 and October 31, the Corps of Engineers would impound all flows exceeding 750 cfs. Of flows below that rate, Colorado would receive the first 500 cfs and Kansas the balance. Recognizing that the compact talks could extend into 1948 and beyond, Leavitt and Mendenhall also agreed that the terms of the 1947 agreement would continue to be used until a compact was reached, subject to the right of either state to cancel the interim accord in any year. *Id.* at 212-14.

G. Conclusions.

Throughout the many agreements and efforts to reach agreement between the states, certain principles appear fairly consistently. The first is the continuing effort to maintain the status quo, as it existed from time to time. This concept related to diversions by the ditch companies in both states, and to the acreage irrigated by them. None of the river allocations was intended to provide water to bring new lands under irrigation. But neither were they expected to deprive users of their existing supplies. While the Kansas allocation of the river was sometimes defined in terms of a specific acre-foot quantity, and sometimes as a percentage of river flow, and sometimes merely as a curb on future Colorado use, the objective was essentially the same. That is, the efforts

were generally to confirm, and to protect against future erosion, the de facto apportionment of river flows that had occurred.

Both states needed additional water even for currently irrigated lands. However, these needs were to be met insofar as possible from the construction of reservoirs to store floodwaters that would otherwise be lost. Primarily, of course, the states were dealing with John Martin Reservoir. Both states were to share in that new conservation storage, and this division was to be in addition to the apportionment of normal streamflows. Neither state contemplated that Kansas' share of conservation storage in John Martin Reservoir would be in lieu of its proper apportionment of the normal flows of the Arkansas River.

SECTION X

ARKANSAS RIVER COMPACT NEGOTIATIONS

Federal approval for negotiations of the Arkansas River Compact was enacted by Public Law 34, 79th Congress, approved April 19, 1945. The statute authorized Colorado and Kansas ". . . to negotiate and enter into a compact not later than January 1, 1950, providing for an equitable division and apportionment . . . of the waters of the Arkansas River and all of its tributaries . . ." Jt. Exh. 3 at 1-4. The legislation also directed the president to name a federal delegate to the compact negotiations, and on November 20, 1945, President Harry S. Truman appointed Hans T. Kramer as the federal representative. Jt. Exh. 3 at 1-3. Kramer was a retired Brigadier General with the Corps of Engineers and had served as a district engineer of the Corps in New Mexico.

The Colorado appointments to the commission were made by the Governor of Colorado on January 12, 1945, pursuant to legislation adopted in 1937. Jt. Exh. 3 at 1-5, 6. The initial Colorado appointees were: Henry C. Vidal, who represented the Arkansas Valley Ditch Association and had participated in *Colorado v. Kansas*; Charles Patterson, Chief Engineer of the Colorado Water Conservation Board; Gail L. Ireland, who had been Attorney General; and Harry B. Mendenhall, who was closely associated with the water users above John Martin Reservoir.

The Kansas appointments were authorized by legislation approved February 28, 1945 and the Kansas Governor made his appointments on March 7, 1945. Jt. Exh. 3 at 1-7, 8. The Kansas commissioners were: George S. Knapp, Chief Engineer of the Division of Water Resources; A. B.

Mitchell, Attorney General; Roland H. Tate, an attorney for the Garden City Company and Kansas' Associated Ditches and an early pioneer who was "born practically on the banks of one of those [Kansas] canals";[39] and William E. Leavitt, who was employed by the United States Irrigating Company. Mitchell was later replaced by Attorney General Edward F. Arn.

The compact commission held 17 meetings. The first meeting took place in Denver on January 7, 1946, and the last on December 13-14, 1948. The official "Record of Meetings" of the Arkansas River Compact Commission is in evidence as Jt. Exh. 3. In addition, a transcript of each meeting was made by a court reporter. The transcript was obtained from General Kramer's files in the National Archives, and is Joint Exhibit 4. The deliberations of the commission were closed to the general public, although certain key individuals were invited from time to time to attend and speak, and various drafts of compact articles were circulated for comment outside of the commission. General Kramer was elected chairman at the first meeting of the commission.

A. The Development of Article IV-D.

For purposes of this case, Article IV-D is the most significant compact provision. The basic issues remaining for this part of the Report are whether postcompact pumping in Colorado and the Winter Water Storage Program violated Article IV-D. This Article provides:

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[39] Jt. Exh. 15 at 20.

> "This Compact is not intended to impede or prevent future beneficial development of the Arkansas River basin in Colorado and Kansas by Federal or State agencies, by private enterprise, or by combinations thereof, which may involve construction of dams, reservoir, and other works for the purposes of water utilization and control, as well as the improved or prolonged functioning of existing works: Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction."

The first true draft of this Article appears to have been prepared by Kramer after the twelfth meeting of the compact commission, and distributed to the other commissioners by letter dated February 20, 1948. Kan. Exhs. 257, 258, 129 at 347-48. At that time, the Article was numbered IV-F. It was renumbered as IV-D at the fifteenth meeting of the commission. Kan. Exh. 129 at 375, 377. The initial version was modified several times. Indeed, the last change occurred at the seventeenth and final meeting of the commission. Jt. Exh. 4 at 17-30. However, the essence of the proviso, namely, that there would be no material depletion of usable flows, remained constant.

B. Federal Development Plans.

Somewhat surprisingly, one of the major concerns during the first year of the compact negotiations dealt with the development plans of the federal government.

Article IV-D ultimately became the vehicle for addressing these issues.

In January, 1946 the Bureau of Reclamation released an ambitious report for the future development of the Upper Arkansas River. Kan. Exh. 241. Not only did the United States propose to integrate John Martin Reservoir into the Gunnison-Arkansas Project, but new reservoirs and developments, including power projects, were planned for the St. Charles, Huerfano, Apishapa, Fountain and Big Sandy Creeks, and for the Purgatoire River. These are all major tributaries to the mainstem of the Arkansas River in Colorado. A map showing the proposed development sites is included in Kansas Exhibit 129 at 265. Moreover, the federal plans called for the construction of wells "along the Arkansas River and elsewhere" in order to supply more irrigation water. Jt. Exh. 3 at 3-10. Imported water from the west side of the Rockies was expected to provide supplemental water for existing irrigated lands, and also to enable "the irrigation of a large area of new land." *Id.* at 3-9.

The compact commissioners were not unresponsive to the benefits that might result from appropriate federal development. But they also recognized that many of the federal goals ran counter to any compact that would maintain the status quo as to existing diversions and that would divide the benefits of floodwater conservation in John Martin. The commission tried a number of different approaches in an effort to reconcile future federal projects with protection to existing users. The earliest approach, suggested by Kramer, was to give the Arkansas River Compact Administration the right to comment on federal plans under the Flood Control Act of 1944. Jt. Exh. 3 at

5-19. That law made irrigation the primary use of water (as opposed to power development) and gave the states only the opportunity to comment on federal projects, and not the power to veto them. Kan. Exh. 129 at 256, 268.

Another method considered was the so-called "paramountcy" clause. Under this provision, upon ratification of the compact by Congress, the United States would be prevented from operating hydroelectric power plants or other works that would "conflict" with any irrigation or other consumptive use, present or future, in either state. *Id.* at 287, 256-57. Another alternative was the creation of a strong Arkansas River Compact Administration that would have authority through the paramountcy clause to pass judgment on future federal development proposals. *Id.* at 258. Another draft article at one time provided that water used by future development projects would be chargeable against the allocation of the state where the project was located. *Id.* at 287; Jt. Exh. 3 at 7-5. Draft Articles X and XI were the sections that included these various approaches.

Consideration of these issues did not occur without much discussion and correspondence with federal officials. However, by the twelfth meeting of the commission in February of 1948 still no language acceptable to both the federal government and the commission had been found. The commission decided therefore not to pursue Articles X and XI any longer. Jt. Exh. 3 at 13-5 to 13-9.

The issue of future federal construction, however, was not dropped. A draft Article IX then addressed a specific federal dam to be built near the mouth of the Purgatoire River. Kan. Exh. 129 at 336. Kramer, at the

same twelfth commission meeting, said that they needed to expand protection beyond the Purgatoire, that they should be concerned about "the effect of any upstream construction on the amount of water that reaches Caddoa." Jt. Exh. 4 at 12-53, 12-96. He suggested to Kansas that if it wanted "to protect or maintain the status quo" that Kansas itself "pick up the ball." Jt. Exh. 4 at 12-57. Kansas apparently responded with a rough draft of a compact that was later circulated to the commissioners, but does not appear in the official record of the commission meetings. Kan. Exh. 253, 257. The first time a full draft of the compact is set forth in the official record is in the record of the thirteenth meeting. Jt. Exh. 3 at 13-18 to 13-26.

Article IX had been reserved for the new reservoir near the mouth of the Purgatoire River. On the Kansas draft, however, that page bears the handwritten note: "Draft to be prepared by Kansas to cover general situation of depleting inflow to Caddoa." Kan. Exh. 253. It appears that Tate prepared a pencil draft which he gave to Kramer. Colo. Exh. 649; RT Vol. 13 at 45-47. In turn, Kramer "roughed out a preliminary draft" that was intended to permit future development with "adequate protection to John Martin Reservoir and the interstate compact apportionment," and sent it to Tate. *Id*. Kramer labeled the new Article as IV-F since he thought the subject fitted more naturally under Article IV. The draft Article IV-F was then sent by Tate to Secretary Noe for transmission to the other commissioners, which apparently occurred on February 20, 1948. Colo. Exh. 651; Kan. Exhs. 255, 257, 258, 129 at 347-48. That draft of what was to become Article IV-D read:

> "Future beneficial development of the Arkansas River Basin by Federal or State agencies, by private enterprise or by combinations thereof, may involve the construction of dams, reservoirs and other works for the purpose of comprehensive and coordinated water utilization and control as well as for the improved or prolonged functioning of existing works. This Compact is not intended to impede or prevent such beneficial development; provided, that the water herein apportioned between the States shall not be materially depleted in usable quantity nor adversely affected in seasonal availability without compensatory benefits to the water users in Colorado and Kansas under this Compact."

Thus, for the first time in the compact drafts, protection against material depletions addressed all future development, by the federal government or otherwise.

C. "Materially Depleted."

In its initial form Article IV-F provided that the water apportioned between the states would not be "materially depleted" by future development. Kan. Exh. 258. However, language developed by Vidal, Ireland and Kramer removed the qualification that any proscribed depletion be "material." Jt. Exh. 3 at 13-65. The modified proviso as it appears in the official record of the thirteenth meeting read:

> ". . . provided, however, that the water herein apportioned between the states shall not thereby be depleted in usable quantity or availability . . . ." *Id*. at 13-62.

The Colorado representatives and Kramer also deleted the phrase that flows would not be depleted "without compensatory benefits." Kan. Exh. 258; cf. Jt. Exh. 3 at 13-62.

In connection with these changes to Article IV-F, the commissioners discussed the meaning of the term "depleted" and what should be the yardstick for determining depletions. Vidal said that "depleted" meant the same as "diminished." Jt. Exh. 3 at 13-67. Kramer argued that any depletion should be measured against the "dependable or historic average of the flow at Caddoa." *Id.* at 13-69. Ireland agreed on the use of an average, that is, the flows that Caddoa would have impounded if upstream works had not been built. *Id.* at 13-66. Kramer also concurred in the use of a long-term average. *Id.* Knapp suggested using the same 35-year base period adopted by the engineering committee (1908-1942) but the idea of settling upon specific years was rejected by the others. There was no disagreement, however, with the principle that depletions would be determined on the basis of average prior flows. Kansas cautions, however, that the compact actually protects the "availability" as well as the amount of usable flow. Kansas argues that, in determining depletions, modern computers allow sophisticated techniques that were unavailable to the compact negotiators.

The term "materially" was reinserted in what was then Article IV-D at the seventeenth and final meeting of the compact commission. The request came from Mendenhall to remedy what he called a local situation in Colorado Springs. A reservoir there had developed a 6 cfs leak. The local people wanted to be sure that these flows

could again be impounded after repairs had been made. Jt. Exh. 4 at 17-30. Tate said it made no difference. "We have had it [material] in and out." *Id.* Kramer agreed, but on reflection he thought it might be better to restore the term. Otherwise, he said, "one teaspoonful of depletion might be interpreted too literally." *Id.* The use of "material" would avoid "an extreme interpretation." *Id.* There being no disagreement, "materially" was reinserted in the final form of the Article IV-D proviso.

Federal officials were also satisfied with this method of dealing with future construction, although the Article encountered some opposition among Colorado users who wanted to be able to claim a larger share of the river. Kan. Exhs. 274, 275; Jt. Exh. 3 at 13-106; Kan. Exh. 129 at 368-73.

D. Protection of Existing Uses.

Article IV-D clearly embraces new construction, but another part of the broader intent was to secure the existing supply of water for lands then irrigated and the existing division of that supply. In the discussions about Articles IV-F and IV-D, commissioners from both states were in easy agreement about their intent to maintain the status quo. Vidal said, "We are compacting about the present existing situation"; "We are trying to preserve a status quo." Jt. Exh. 4 at 12-54, 56; Jt. Exh. 3 at 13-100. Knapp concurred, emphasizing the need to be assured ". . . that the present conditions on the river will not be disturbed by the possibility of consumptive uses upstream." Jt. Exh. 4 at 12-54, 55. He pointed out that "The more consumptive use you build up upstream, the

less water will be present downstream from the same original water supply." *Id*. at 53-54. General Kramer put it more dramatically, noting that the Article permitted "new uses" but subject to ". . . keeping sacred the available water supply that is set up by the Compact." *Id*. at 17-37. Kansas interprets this emphasis on protecting the status quo as giving it a right to the amount of water used historically on approximately 70,000 acres of land that were irrigated by surface diversions and alluvial pumping developed as of 1948. Kan. Pre-trial Statement at 30.

The commissioners recognized the need to protect the supply flowing into Caddoa. In response to a question from one of the Bureau of Reclamation officials, Vidal said, ". . . it was our purpose to protect the situation with which we are dealing, namely the supply of the river at Caddoa, and a division and allocation thereof." Kan. Exh. 129, Vol. II at 365. Mendenhall, Kramer and Knapp also voiced the importance of protecting the flows into Caddoa. *Id*. at 364; Jt. Exh. 4 at 12-52, 53. Knapp described the water supply at Caddoa, together with the river gain below Caddoa at the Stateline, as the "basis of the apportionment in the Compact." Jt. Exh. 3 at 13-73. He said that Article IV-F (the forerunner of IV-D) would prevent depletion of that supply by "over-diversion." Jt. Exh. 3 at 13-101. Tate expressed the need to protect the present supply of water from depletion ". . . in anywise by some new developments or additional users." Jt. Exh. 4 at 12-102.

It is significant that the extensive record of compact negotiations does not reflect, at least insofar as I have been able to find, discussion of the extent of pumping that was then occurring in Colorado. The attention of the

compact commissioners was focused entirely on surface diversions by the various ditch companies. Protection of their supplies, limits on new ditches or diversions, limits on increased diversions – these were the issues. The engineering committee gathered and presented extensive data for the period 1908-42. These data included monthly streamflow measurements at nine stations along the river; monthly measurements of diversions in both Colorado and Kansas; transmountain imports; surface storage calculations including temperature, wind velocity, humidity, precipitation, and evaporation; and reservoir sedimentation studies. The committee's report specifically stated that irrigation supplies derived from pumping in both states were not included in the tabulated diversions. Jt. Exh. 5 at 3.

Current well pumping in Colorado appears simply not to have been a matter of concern to the compact commissioners. Had pumping been of any appreciable magnitude, I cannot believe that such use of water would not have surfaced in the engineering committee report and the compact negotiations. Absence of such discussion leads to the conclusion that pumping at that time was not large, a conclusion which is supported by other evidence in the case. Certainly, the compact commissioners did not foresee the technological breakthrough of the turbine pump and other conditions that led to the great increase in pumping which began in the 1950s. That is not to say that the compact language is not broad enough to cover depletions caused by pumping. I believe that it is, and that the intent of the commissioners was to protect against material depletions from any cause. However, during the compact negotiations the specific threat

appeared to be from future construction of dams and reservoirs, not from pumping.

The Kansas commissioners understood that under the compact and with the construction of John Martin Reservoir, Kansas was ". . . going to get a lesser supply of water, but with somewhat better usability." Jt. Exh. 4 at 17-33, 34. This was Knapp's comment at the final and seventeenth meeting of the commission after noting that Stateline flows over the 1908-42 period had averaged 280,000 acre-feet per year. Of course, this average included unusable flood flows. Comparisons of precompact and postcompact Stateline flows need to take these differences into account.

E. Article V on Apportionment.

A stated purpose of the compact is equitable apportionment of the waters of the Arkansas River, as well as the benefits arising from the construction, operation and maintenance of John Martin Reservoir. Article I-B. This goal is specifically addressed in Article V. Littlefield devoted a large part of Vol. II of his report to the negotiations leading up to this Article, which he described as "an immensely complicated task." Kan. Exh. 129, Vol. II at 392. However, the trial focused on Article IV-D, and the provisions of Article V warrant only a brief review.

The basic task undertaken by the commission in Article V was to determine what the existing division of river flows had been, and to develop a methodology for carrying that apportionment forward. Also the benefits of the new conservation in John Martin Reservoir had to be allocated. With respect to normal flows, the protection of

the status quo remained a dominant consideration. In Patterson's words, the important quantities of water were those that "heretofore have been diverted and appropriately used in the two states." *Id.* at 395-96. Historically, based upon the 1908-43 period, the ratio of diversions between the ditches in Water District 67 in Colorado (below John Martin) and those in Kansas was about 65/35.[40] Patterson, however, suggested that the future apportionment should be 60/40 in order to compensate Kansas for the increased use by ditches above John Martin. *Id.* at 420.

By the tenth meeting of the commission in September, 1947, the engineering committee had completed and submitted its report on basic water supply and use data, and the specific allocations in Article V began to emerge. The format of the apportionment was based upon the interim operating agreement negotiated by Mendenhall and Leavitt. Article V was essentially final by the fourteenth meeting in July, 1948, including an agreement that Kansas' share of normal streamflows would be measured at the Stateline rather than as inflow to the Reservoir, and that Stateline flows could be made up of return flows and other accretions to the stream occurring below John Martin.

Put succinctly, the final form of Article V provides that all winter flows into John Martin Reservoir (November 1 to March 31) will be stored, subject to Colorado's right to demand releases of 100 cfs. Summer flows (April

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[40] An average of 159,100 acre-feet annually in Water District 67 compared to 84,400 acre-feet in Kansas. *Id* at 420.

1 to October 31) are to be passed through the Reservoir up to flows of 750 cfs. The apportionment of these flows gives Colorado the right to releases from John Martin equivalent to river flow up to 500 cfs, and Kansas the right to that portion of river flow between 500 and 750 cfs. Summer inflow in excess of these releases is stored.

Stored water, whether conserved during the winter or summer months, is a common resource. Either state may demand releases of stored water "at any time during the summer storage period," provided that releases to Colorado shall not exceed the rate of 750 cfs and those to Kansas may not be greater than 500 cfs. If the conservation pool is less than 20,000 acre-feet, the release rates drop to 600 and 400 cfs, respectively. When there is water in the conservation pool, users upstream of John Martin are free from senior priorities in Water District 67. However, if the conservation pool is liable to be exhausted within fourteen days, Colorado must revert to administration of decreed priorities. Under those circumstances, Kansas is not entitled to any of the flows entering John Martin, although waters which may flow across the State-line are apportioned to Kansas. Ditch rights within Water District 67 and in Kansas may not be increased unless the compact administration finds that usable flows will not be materially depleted or adversely affected.

During the hearings on legislation to secure congressional consent to the compact, it was pointed out that the division of water was basically on a 60-40 ratio. Jt. Exh. 15 at 11, 15, 33. However, this was not intended as a rigid formula. Gail L. Ireland testified that either state might take more of the stored water "if the needs and conditions require it." *Id.* at 15. He said that the provisions

allowing both states to draw upon the pool of conserved water were inserted deliberately "in order to provide the water users with the very best possible use of this water at all times." *Id.* Hans Kramer described Article V as a "self-imposed rationing system." *Id.* at 33. General Kramer also pointed out that the compact precluded the allowance or accumulation of credits or debits due to variations from the 60-40 ratio, a provision which he called "boldly progressive." *Id.* All witnesses, for both states, expressed the same optimism that a half century of almost constant litigation was now fairly and finally settled. Clifford H. Stone, Director of the Colorado Water Conservation Board, called it a "red-letter day." *Id.* at 7.

Of course, since 1980 deliveries to Kansas and to the Colorado users in Water District 67 have been made pursuant to the 1980 Operating Plan rather than the provisions of Article V. The 1980 plan supersedes the "common pool" concept in John Martin Reservoir and establishes separate storage accounts for each state. Kansas takes the legal position that the compact administration lacked authority to adopt the 1980 plan. Yet Kansas acknowledges the benefits to both states that accrue from operating under the plan; Kansas has not exercised its option to cancel it; and Kansas makes no claim against the compact administration for the way in which it has administered the compact. Kan. Answer Br. at 52-53; RT Vol. 78 at 13.

In its Closing Brief re Kansas' Well Claim, Colorado quotes the testimony to Congress by George S. Knapp, the Kansas Chief Engineer and Chairman of the Kansas commissioners, to the effect that all the compact did was to convert floodwaters that otherwise would have gone to

waste into usable flows. Page 4. But that is not Knapp's full view of the compact. Indeed, in his report, also made part of the congressional hearing record, he specifically stated that the compact divided the "ordinary river flow" in addition to floodwaters made usable through the construction of John Martin Reservoir. Jt. Exh. 15 at 19.

Colorado states that the compact does not apportion the river on the basis of beneficial consumptive use, but rather "provides for a flexible and indeterminate apportionment based on the right of both States to make demands for releases from John Martin Reservoir." Colo. Closing Well Br. at 4. Of course, the compact also protects *inflow* into John Martin and divides, between the two states, the normal summer flow of the river, which must be passed through the Reservoir. Colorado's description of a "flexible and indeterminate apportionment" appears to come from a 1951 letter written by Hans Kramer to the Corps of Engineers. Colo. Exh. 57 at 2. In that letter Kramer describes the flexible philosophy as "Live and Let Live," which is also quoted by Colorado. Colo. Closing Well Br. at 5. However, it is clear that Kramer's remarks relate only to the conservation pool in John Martin and the ability of both states to draw upon it according to need.[41] Kramer's letter was not an effort to describe or summarize the entire compact.

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[41] The Arkansas River Compact contrasts sharply with the Pecos River Compact adopted by New Mexico and Texas at about the same time, namely, in 1948. The Pecos River Compact was based upon an Inflow-Outflow Manual which was to be used in determining flows into Texas according to particular levels of precipitation, and under consumption conditions prevailing in New Mexico in 1947. Despite this specificity, litigation developed when it became clear that the tables in the manual did not describe the actual state of the river, and that Texas was not receiving the flows originally intended. *Texas v. New Mexico*, 462 U.S. 554, 77 L.Ed.2d 1, 103 S.Ct. 2558 (1983); *Texas v. New Mexico*, 482 U.S. 124, 96 L.Ed.2d 105, 107 S.Ct. 2279 (1987).

F. Conclusions about the Meaning of the Compact.

From all of the evidence in the case, and not merely from the summary and citations in this section of the Report, I have reached these conclusions about the meaning of the Arkansas River Compact:

1. The compact commissioners intended to and did effect an equitable apportionment of the waters of the Arkansas River.

2. The apportionment in the compact includes the normal flows of the river, as well as a division of the benefits associated with the conservation pool in John Martin Reservoir. Kansas is not limited merely to receiving its share of floodwaters conserved by John Martin Reservoir and which otherwise would have been unusable.

3. The apportionment was based upon conditions that existed at the time of the compact negotiations. The allocation of normal flows reflected generally the existing division of waters between the states and the uses that had been occurring. There was no intent to deprive existing users of water; and except as might be possible through increases in the usable supply, there was no intent to provide water for new irrigation.

4. The compact was intended to and does apply to all waters originating in the natural drainage basin of the Arkansas River and its tributaries upstream from the Stateline. This includes return flows from the use of such

water, and to tributary groundwater. Specifically, the compact applies to groundwater in the valley fill aquifer and in the bench or surficial aquifer, as described in the evidence.

5. Article IV-D allows future development of the Arkansas River basin in both Colorado and Kansas, provided that such development or construction does not materially deplete the usable flows of the river for use in either or both states. The compact is intended to protect such usable flows from material depletion caused by any increased consumptive use, including the construction of new wells or increased levels of pumping from precompact wells.

6. The term "materially depleted" in Article IV-D was meant to preclude complaints for trivial or inconsequential reductions in flow.

Additional conclusions about the intent of the compact are included later in the Report as part of the discussion of specific issues.

SECTION XI

COLORADO'S ADMINISTRATION OF GROUNDWATER PUMPING

Prior to 1965 Colorado had no administrative system for the regulation of groundwater pumping. Wells could be constructed and operated without regard to their impact on surface water users. Both the state engineer and the Attorney General of Colorado took the view that the state engineer did not have authority to curtail well production. Colo. Exhs. 365, 367, 368. The only exception, advised the Attorney General in 1964, was for wells "in the stream bed itself." Colo. Exh. 368. This remained his opinion, even though he stated that "We are all aware that tributary underground waters are a part of the natural streams of the watersheds in which they are situated, and are subject to the doctrine of appropriation under our State Constitution." Colo. Exh. 368.

The Colorado Supreme Court in *Fellhauer v. People*, 167 Colo. 320, 328-9, 447 P.2d 986, 990 (1968), quoted Benjamin Stapleton, Chairman of the Colorado Water Conservation Board, for a contrary view of the authority of the state engineer to regulate groundwater, but found it unnecessary to resolve the question. In any event, Colorado made no effort to regulate the pumping of groundwater tributary to the Arkansas River before 1965.

In 1957 Colorado had adopted legislation requiring permits for new wells, and calling for the registration of existing wells. The issuance of the permit, however, was ministerial. The state engineer could not withhold a well permit. RT Vol. 76 at 25, 106. The 1957 statute provided that:

> "Upon receipt of an application for a new, increased or additional supply of ground water from an area outside the boundaries of a tentatively critical ground water district . . . the State Engineer shall issue a 'permit to use ground water.' " Colo. Sess. Laws Ch. 289, § 5 (1957).

The Colorado system of laws and administration thus permitted a large number of wells to be drilled in the alluvium of the Arkansas River basin without consideration of their impact on vested surface rights, and indeed in the early years even without the knowledge of the state. According to evidence introduced by Colorado, some 1233 new large irrigation wells (i.e., those having a capacity of 100 or more gallons per minute) were drilled between 1949 and 1965. Colo. Exh. 165*, Table A.1. The Colorado evidence also shows 112 such wells allowed after 1965. Kansas inventoried wells over 50 gpm, and noted even a larger number of postcompact wells.[42]

A. Comparison Between Surface and Groundwater Control.

The lack of control over wells is in sharp contrast to Colorado's tightly administered system for the regulation of surface diversions. Colorado is an "appropriation" state. Article XVI, section 6 of the Colorado constitution provides, *inter alia*:

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[42] Kansas' evidence showed a total of 2,543 wells in 1985, and in the order of 850 in 1948. Colo. Exh. 851; Kan. Exh. 30, Table 2.

> "The right to divert the unappropriated waters of any natural stream to beneficial uses shall never be denied. Priority of appropriation shall give the better right as between those using the water for the same purpose."

As to surface diversions, Colorado thus follows the principle of "first in time, first in right." Indeed, that was the rule even before the state constitution was adopted. *Coffin v. Left Hand Ditch Co.*, 6 Colo. 443 (1882). Large-scale irrigation along the Arkansas River began in 1974 in the Rocky Ford area. Jt. Exh. 105 at 8. One of the senior rights to divert surface flows from the Arkansas River belongs to the Rocky Ford Ditch for 111.76 cfs, with a priority date of May 15, 1874. Kan. Exh. 19, 20.

The state is now divided into seven water divisions, corresponding to major surface drainage areas. Division 2 covers the Arkansas River, and that division in turn includes three water districts that embrace the mainstem of the river between Pueblo and the Stateline. Districts 14 and 17 lie upstream of John Martin, and District 67 covers the area from John Martin to the Stateline. Each water district is administered by a water commissioner who is an employee of the Division of Water Resources. These commissioners regulate the surface flow of the river in accord with the various rights and decrees.

In times of shortage, canals with junior water rights are curtailed in order to satisfy the demands of more senior rights. Because the river is over-appropriated, there is frequently a "call" on the river, that is, a limitation on diversions under junior rights in order to make water available to a canal with prior rights. RT Vol. 72 at 99-100. The call may move up and down the river "on an

hourly basis." RT Vol. 78 at 56. In 1984, the state engineer issued a water rights tabulation showing approximately 7,000 separate water rights along the Arkansas River, each with its own priority. Jt. Exh. 25.

River flows and diversions are now regulated through an extremely sophisticated satellite monitoring system. Most of the surface water gages have a continuous monitoring device associated with them, and streamflows from the various locations are relayed from the gaging stations to Denver by satellite. RT Vol. 67 at 117-18. There are some 80 data collection platforms in the Arkansas River basin, monitoring flows on the mainstem, on the tributaries, and at the major canals. *Id.* at 118. Data are collected at fifteen minute intervals, and are automatically relayed every four hours. However, Colorado officials can "dial in" and get data "as little as 15 minutes old." *Id.* at 120.

By way of contrast, Colorado does not generally require meters on wells, does not require any reports on the amount of water pumped, and does not have well pumping data along the Arkansas, except as prepared in connection with this case or for USGS or other reports. Indeed, one of the major factual issues during this trial has been the amount of water pumped, both in precompact and postcompact years. The location and distribution of pumping are also important for hydrologic modeling purposes. Both states have made enormous efforts under difficult and sometimes virtually impossible circumstances to collect or to create the required pumping data. But even so, reproducing conditions since 1950

cannot be done with certainty. Obviously Colorado's well data base could stand improvement.[43]

B. The Increases in Groundwater Pumping.

Pumping from groundwater tributary to the Arkansas River was not significant in the precompact years. Dr. Jeris Danielson, who was then the state engineer and head of the Colorado Division of Water

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[43] Both the former and present state engineers testified that requiring meters on wells was not feasible. Dr. Jeris Danielson, who was then the state engineer, testified that requiring meters on some 1,600 wells spread over thousands of square miles does not mean that the state would get compliance or accurate records. "I have seen many instances where a meter never works on a well. It is always broken. It is vandalized. It has sand in the mechanism. It just will not work." RT Vol. 77 at 126. Dr. Danielson said, "I can't lock up 1,600 well owners in the Pueblo County jail because they refuse to have a meter that works. So you have to look at another way to skin the cat." RT Vol. 77 at 127. His policy was to require meters on replacement well permits. He concluded that "Ultimately, we'll have a meter on every well." RT Vol. 77 at 128. Hal Simpson, the current state engineer, testified earlier in his capacity as deputy state engineer. He emphasized the physical difficulty of maintaining flow meters in older wells. He said they pump sand and "wear out very fast." RT Vol. 67 at 116. For this trial, both states estimated pumping through the use of power records and pump efficiency tests. However, none of these data sources, particularly during the earlier years, was what engineers would like to have. For the future, it would seem that at least the factual basis required to estimate pumping through this methodology could be strengthened. Hal Simpson testified that he is now requiring the two major well organizations in the Arkansas Valley to measure power consumption coefficients and estimate pumping based on power records. RT Vol. 130 at 52-53.

Resources, testified that wells "weren't relied upon generally." RT Vol. 76 at 35. Although Colorado had no records during the 1940s of the number of wells or amounts of water pumped, later studies attempted to create these data. A 1968 report prepared pursuant to Colorado Senate Bill 407 put the pumping in 1940 at only 2,300 acre-feet. Jt. Exh. 92 at 22.[44] The report shows a gradual increase in pumping during the 1940s, reaching 23,000 acre-feet in 1949. *Id.* at 22. Similar figures were published by the Colorado state engineer in a 1975 report prepared for the trial on the amendment to the 1973 Rules in the case of *Kuiper v. Atchison, Topeka & Santa Fe Ry. Co.*, 195 Colo. 557, 581 P.2d 293 (1978). Jt. Exh. 94 at 22; RT Vol. 77 at 35-36. By way of contrast, diversions by the various ditch companies between Pueblo and the Stateline averaged approximately 857,000 acre-feet annually during the precompact years of 1908-1942. Jt. Exh. 5 at 20.

The "big surge" in well development along the Arkansas River came in the 1950s and early 1960s. RT Vol. 76 at 102. Danielson attributed this rapid increase to an improvement in technology, namely, the vertical turbine pump, and to the availability of inexpensive electrical power. RT Vol. 76 at 102; Kan. Exh. 514, Vol. I at 210. Precompact pumping had been accomplished primarily by centrifugal lift pumps, sometimes powered by tractors. RT Vol. 76 at 102. The Water Court in the trial on the

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[44] The Colorado evidence prepared for this trial claimed that the 1940 pumping amounted to 36,837 acre-feet. The approach used by Colorado to reach this larger figure will be discussed later.

state engineer's amendment to his 1973 Rules described the use and value of groundwater in one of its findings:

> "The evidence is uncontroverted that irrigation wells are now used where available to overlying owners to supplement surface decrees when surface supplies are short. Thus, wells are pumped in the spring before the runoff begins in order to start crops. Without supplemental groundwater in the spring, seed loss may be experienced from lack of soil moisture necessary for germination. Wells are also pumped in the late summer and fall when surface water supplies are not adequate to 'finish' crops and lack of well water at this time reduces crop yields. Such a regimen of conjunctive use of well and River water has developed uniformly throughout the Arkansas Basin over a substantial time period, and now appears to have the acquiescence if not the support of a substantial part of the irrigation economy in the basin . . . The use of wells in the Arkansas Valley has made water available in the early spring and late summer and fall periods when water is needed for irrigation but would not otherwise be available from surface diversions." Jt. Exh. 157 at 10.

While pumping data are in dispute, both states showed large increases in pumping between 1950, the first postcompact year, and 1964, the last year before efforts by Colorado to regulate pumping. Colorado estimated pumping in 1950 from Pueblo to the Stateline at 41,458 acre-feet. In 1964 Colorado shows that pumping had risen to 203,925 acre-feet. Colo. Exh. 165*, Table A.1. The comparable Kansas figures are 31,201 acre-feet for 1950, and 220,079 acre-feet for 1964. Colo. Exh. 852.

The consumptive use of well water through transpiration and evaporation varies with many factors – the type of crop, the location, method of irrigation, water application rate, and various climate and soil conditions. Along the Arkansas River in Colorado, average consumptive use figures ranging between 60% and 80% have been used in various historic documents. Colo. Exh. 386 at 275; Jt. Exh. 92 at ii. Most of the reports, however, fall between 70% and 80%. Jt. Exh. 78; Jt. Exh. 91 at 11. The State of Colorado itself, in a report done in 1975, estimated consumptive use at 75%, with the remainder of the applied water returning to the stream system. Jt. Exh. 94 at 51.

Whatever the specific percentage may be, however, it is clear that additional pumping in Colorado, absent an offset in surface diversions, increases the consumptive use of water in Colorado and ultimately decreases the surface flows of the Arkansas River.

Danielson testified that the damage done to surface flows "is very closely related to the consumptive use of the well water that is withdrawn from the alluvium." RT Vol. 77 at 34, 37-38. In the 1975 trial of *Kuiper v. Atchison, Topeka & Santa Fe Ry. Co.*, on the Amendment to the 1973 Rules, Danielson who was then the deputy state engineer testified to the same effect, namely, that the consumptive use of well water can be shown as a decrease in river flows. In that case, he estimated that such consumptive use averaged about 112,800 acre-feet per year in the period 1965 through 1972, plus phreatophyte losses. Kan. Exh. 514, Vol. I at 232. See also Jt. Exh. 92 at ii, vi; Jt. Exh. 94 at 1, 53. However, under examination by Colorado's counsel during this trial, he said that the river loss which he quantified occurred in the whole reach from Pueblo to

the Stateline. It would not in his opinion translate into a reduction at the Stateline. He did not make a Stateline determination. RT Vol. 78 at 85.

C. Colorado's First Efforts to Regulate Pumping.

The pressure to regulate groundwater pumping in Colorado, which resulted in the 1965 legislation, came not from Kansas but from holders of surface rights in Colorado. One commentator states that matters came to a head when a number of the canal companies in the Arkansas Valley filed a petition with the state engineer demanding that he curtail well diversions, and their petition was dismissed for lack of jurisdiction.[45] However, another commentator indicates that it was a "crisis" situation in the state as a whole. He states that in 1964 alone some 5,911 new wells were constructed.[46] In any event, the 1965 Act succinctly directed the state engineer to administer the distribution of surface waters, "including the underground waters tributary thereto" in accordance with the right of priority of appropriation. Colo. Exh. 378, C.R.S. § 148-11-22. The state engineer was also authorized to apply to the courts for an injunction to prevent well diversions "from materially injuring the vested rights of other appropriators." *Id.*

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[45] "Integrating Ground and Surface Water Use in an Appropriation State," 20 Rocky Mountain Min. L. Inst. 691 at 697 (1975).

[46] "Appropriation and Colorado's Ground Water: a Continuing Dilemma?" 40 Univ. Colo. Law Rev. 133 (1967), also quoted in "A Survey of Colorado Water Law," 47 Denver Law Journal 226 at 324 (1970).

The state engineer's first attempt to enforce this legislation was set aside by the Colorado Supreme Court. The division engineer ordered that 39 wells along the Arkansas River cease pumping, although he testified that all of the large irrigation wells, more than 1,600 of them, affected river flows. *Fellhauer v. People*, 167 Colo. 320, 447 P.2d 986 at 992-93 (1968). The division engineer added that he didn't want to shut down all of the wells, "because you are going to affect the economy of the valley." *Id.* Under these circumstances, the Colorado Supreme Court, sitting *en banc*, easily found that the action of the state engineer's office was discriminatory, and in violation of the equal protection clause of the federal constitution and the due process clause of the Colorado constitution. *Id.* at 993.

However, going far beyond what was required to decide the case before it, the Supreme Court set forth three "requirements" for any future valid regulation of wells under the 1965 Act. Pertinent here is the statement that there must be only a "reasonable lessening" of material injury to senior rights. *Id.* at 993. This appears to be a more lenient standard than the act itself, which calls for an injunction when necessary "to prevent" material injury. The "reasonable lessening" test is tied to another pronouncement of the Court. The Court stated that, along with the protection of vested rights, "there shall be *maximum utilization* of the water of this state." *Id.* at 994, emphasis in original. The "new drama" of the next century, said the Court, would be how the doctrine of maximum utilization could be constitutionally integrated into the law of vested rights. *Id.* at 994.

Notwithstanding the Court's rebuff of his efforts to regulate pumping from existing wells, the state engineer essentially refused after 1965 to issue permits for new alluvial wells along the Arkansas River between Pueblo and John Martin Reservoir. RT Vol. 130 at 115-16. This portion of the river was described by Colorado throughout the trial as Reach 3. However, the state engineer did not follow the same policy in the river reach between John Martin and the Stateline, a distance of about 58 miles. Colorado designated this area as Reach 4, and its tabulation of wells shows that 90 new wells were allowed in Reach 4 between 1965 and 1985. Colo. Exh. 165*, Table A.1. Danielson testified that as state engineer he did not issue any well permits after 1979, either upstream or downstream of John Martin, because there was "no unappropriated ground water left." RT Vol. 76 at 115, 110.

D. The 1967-68 Studies.

In 1967 the Colorado General Assembly adopted Senate Bill 407, "providing for a study of water resources, water uses, and the administration of applicable water law." Colo. Exh. 380. The legislative charge was to investigate relationships in the areas where intermingled surface and groundwater were commonly used in conjunction with each other, and to determine the need for and content of legislation that would provide for the integrated administration of all diversions and uses of water. The directions further called for the protection of all vested rights, along with the "full utilization of all waters in the state." *Id.*, Section 1(b). The study of the Arkansas River that resulted from that legislation was the basis of a 1968 report prepared by W. W. Wheeler and

Associates, and Woodward-Clyde & Associates, hereafter referred to as the "Wheeler Report." Jt. Exh. 92.

The Wheeler Report states that drafts were reviewed by the Colorado state engineer, the Colorado Water Conservation Board, and the U. S. Geological Survey. The report concludes, *inter alia*:

> (a) That the limited and variable flows of the Arkansas River are generally inadequate to fully supply the irrigation water requirements of the basin.
>
> (b) *That the use of wells in recent years has materially decreased the surface flows available to direct flow and storage rights.* (Emphasis added)
>
> (c) That groundwater in the alluvium between Pueblo and the Stateline amounts to about 1,600,000 acre-feet, of which about 460,000 acre-feet are theoretically useable. Jt. Exh. 92 at v and vi.

The report also recommended that recorders be installed on all wells, and that accurate and continuous discharge records be obtained of major tributary inflow. *Id.* at vii. Neither of these recommendations was implemented, although some tributary streamflow gages were installed.

E. The 1969 Act.

The next legislative effort attempting to reconcile the competition between wells and surface rights was the "Water Right Determination and Administration Act of

1969." Colo. Exh. 385; C.R.S. § 148-21-1, *et seq.*[47] This act made significant changes in Colorado water law, establishing the seven new water divisions, setting up a system of Water Courts, requiring a statewide tabulation of water rights, and initiating numerous other administrative procedures. For purposes of this action, however, the importance of the act lies in its declaration of policy and in its provisions relating to wells.

The legislature declared it to be the state policy of Colorado ". . . to integrate the appropriation, use and administration of underground water tributary to a stream with the use of surface water, in such a way as to maximize the beneficial use of all of the waters of this state." § 148-21-2(1). The act further declared ". . . that the use of underground waters as an independent source or in conjunction with surface waters is necessary to the present and future welfare of the people of this state." § 148-21-2(2). The legislature directed that "the existing use of groundwater, either independently or in conjunction with surface rights, shall be recognized to the fullest extent possible, subject to the preservation of other existing vested rights." § 148-21-2(2)(b). The act provided that groundwater could also be considered as an alternate or supplemental source of supply for surface decrees previously entered.

Groundwater rights were brought into the adjudication system. Applications for groundwater rights filed by July 1, 1971 were permitted to obtain a priority date

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[47] "Few proposals have undergone such extensive and heated debate as the 1969 water bills." The Groundwater-Surface Water Conflict, 43 Univ. of Colo. Law Rev. 1, 24 (1971).

corresponding to the date of actual appropriation. § 148-21-22. State water officials were directed to administer ground and surface waters together in accordance with their priorities, but diversions were not to be curtailed unless they would cause "material injury" to water rights with senior priorities. § 148-21-35.

The references to conjunctive use and maximizing the use of all of the waters in the state coincide with the conclusions of the 1968 Wheeler Report. That report pointed to 1.6 million acre-feet of groundwater in the alluvium between Pueblo and the Stateline, of which 460,000 acre-feet were said to be "theoretically useable."[48] Jt. Exh. 92 at vi. The report concluded that "The best utilization of the basin's water resources would be through the integrated or conjunctive use of wells, the storage of winter flows and excessive diversions, and the delivery of water in phase with crop requirements." *Id.*

Obviously, the policies and directions enunciated by this act did little to resolve the inherent conflicts between a priority system for surface diversions that had been fully developed before the turn of the century, and the much later use of wells pumping tributary groundwater. The dilemma was softened, perhaps, only by the fact that well owners and surface rights holders were not distinct groups pitted against each other. Most owners of surface

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[48] The Colorado Supreme Court later used an estimate of 2.0 million acre-feet of groundwater in the alluvium. *Kuiper v. Atchison, Topeka & Santa Fe Ry. Co.*, 195 Colo. 557, 581 P.2d 293 (1978). The USGS also used 2.0 million acre-feet in a 1970 report. Jt. Exh. 66 at 2.

rights also benefitted from wells. *Kuiper v. Atchison, Topeka & Santa Fe Ry. Co.*, 195 Colo. 557, 581 P.2d 293 (1978).

F. The 1971 Kuiper Decision.

Meanwhile, the state engineer was proceeding to develop rules and regulations as required by the *Fellhauer* decision. The regulations, as promulgated, were applicable to the South Platte and Arkansas Rivers for only the limited period of August 8 to October 15, 1969. Colo. Exh. 383. They reflected the requirement in *Fellhauer*, that the regulations effect a "reasonable lessening" of material injury, rather than the prevention of such injury. The policies under which the rules were promulgated included the statement:

> "Every effort is made to utilize the water found in the alluvium which water is hydraulically connected to the surface channel of the streams of the state." *Id.* at 2.

Moreover, the policies declared that the existing use of groundwater, either independently or in conjunction with surface rights, "shall be recognized to the fullest extent possible, subject to the preservation of other existing vested rights." *Id.*

The regulations were designed, they stated, to accomplish three main purposes: to protect vested rights, to preserve the economy that had been established through the use of wells "to the fullest extent possible," and to obtain maximum possible utilization of the waters of the state. *Id.*

The regulations grouped wells into three zones according to the time that would elapse between the commencement of pumping and their effect upon the surface stream. The regulations were to be implemented only upon the written demand of a senior surface appropriator and, in no event were wells to be curtailed more than three days per week. *Id.* at 6.

A group of well owners in the South Platte Basin promptly attacked the regulations and were able to obtain a permanent injunction from the trial court. On appeal, the Colorado Supreme Court, sitting *en banc*, overturned the trial court, rejecting the various objections to the regulations, finding that they were consistent with the requirements of the *Fellhauer* decision and of the 1969 Act, and that they represented a reasonable attempt to achieve the goal of maximum utilization. *Kuiper v. Well Owners Conservation Ass'n*, 176 Colo. 119, 490 P.2d 268 (1971).

In this decision, the Colorado Supreme Court reinforced its earlier policy pronouncements:

> "In *Fellhauer*, we attempted to sound the note of a new era in the utilization and optimal use of water. It appears to us that the General Assembly reacted favorably to that attempt and in turn sought to promote in detail the general thought of *Fellhauer*. We have the same view of the acts of the State Engineer. We suggest that there is a slight indication of a feeling upon the part of the plaintiffs and on the part of the trial court that changes should not be required in the operation of wells on the Platte River. There must be

> change, and courts, legislators, the State Engineer and users must recognize it." 490 P.2d 268 at 283 (1971); Colo. Exh. 386.

G. The 1973 Rules.

Continuing to wrestle with the competing concepts of maximizing the use of ground and surface rights while still protecting the priority system, the state engineer issued new rules and regulations in 1972. RT Vol. 76 at 110-11; Jt. Exh. 93. These rules became effective on February 19, 1973, and today are still the rules and regulations which regulate pumping on the Arkansas River. RT Vol. 76 at 19-20; Jt. Exh. 157 at 5-6. They are quite simple. They limit pumping to three days a week, unless the division engineer approves a written plan whereby "the amount of the depletion from the stream by said well or wells will be returned to the stream so that prior vested rights are not damaged." Jt. Exh. 93 at 2. The rules are intended to provide for a "reasonable lessening of material injury, whether present or future, to senior appropriators." *Id.* No protests to these rules were filed. Jt. Exh. 157 at 6.

Dr. Danielson, then state engineer for the State of Colorado, was called by Kansas as a hostile witness during the trial of this case. He acknowledged that the 1973 rules and regulations have not, in fact, reduced pumping below the 1973 levels. Indeed, pumping increased. RT Vol. 76 at 30-31. According to Colorado's own pumping data, well pumping in 1973 amounted to 128,354 acre-feet. Yet pumping in the highest subsequent year, 1976, reached 285,887 acre-feet. In no year through 1985 was the pumping less than the 1973 level. Colo. Exh. 165*, Table A.1.

While Danielson testified that the 1973 rules were intended to "protect existing wells, not to allow expansion," the state engineer at that time (C. J. Kuiper) continued to permit new wells in the area downstream from John Martin. RT Vol. 77 at 118; RT Vol. 76 at 112-15; RT Vol. 130 at 63-64. This was particularly true in the area below the Buffalo Canal headgate, that is, downstream from the last surface diversion in Colorado, and close to the Stateline. In its closing brief, Colorado states that it "does not dispute that wells drilled east of the Buffalo Canal headgate after 1965 depleted Stateline flows to some extent during the 1970s." Colo. Closing Well Br. at 19; RT Vol. 115 at 62. However, Colorado maintains that such depletions have been offset by the 1980 Operating Plan for John Martin Reservoir.

H. Amendment to 1973 Rules.

On January 4, 1974 the state engineer attempted to tighten the 1973 regulations. He proposed an Amended Rule 3 to be effective March 27, 1974. The amendment provided for pumping curtailment of five days per week during 1974, six days during 1975, and total curtailment in 1976. *Kuiper v. Atchison, Topeka & Santa Fe Ry. Co.*, 195 Colo. 557, 581 P.2d 293 (1978); Colo. Exh. 387. The shutdown provisions, however, under both the amendment and the 1973 rules, did not apply to wells operated as alternate points of diversion for surface rights in priority, or wells that were embraced within augmentation plans approved by the state engineer. *Id.* at 296.

Numerous protests were filed to the amended rule. These were consolidated for trial in the Water Court,

which disapproved Amended Rule 3, but decreed that the 1973 rules should otherwise remain in effect, thus allowing all wells to continue to pump at least three days a week. The state engineer appealed. The Colorado Supreme Court, sitting *en banc*, affirmed the position of the Water Court. *Id.* at 294.

I. State Engineer's 1975 Report.

In preparation for the Water Court trial on the amendment to the 1973 rules, the Colorado state engineer prepared a report entitled "Stream Depletion by Wells in the Arkansas River Basin – Colorado, March, 1975." Jt. Exh. 94; RT Vol. 76 at 86-87. The study and report were done under the supervision of Dr. Danielson, who was then the deputy state engineer.[49] Dr. Danielson testified that he was personally involved in this work, and the report became a principal exhibit in the trial before the Water Court. RT Vol. 76 at 88, 94; RT Vol. 77 at 35-36.

This 1975 report is significant here also. The state engineer's investigation was undertaken:

> ". . . for the purpose of determining if the pumping of alluvial wells is significantly depleting the Arkansas River and thus causing material injury to senior surface water appropriators.

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[49] Dr. Danielson joined the state engineer's office in 1970 as chief of planning and was appointed state engineer in 1979. Colorado characterized him as a "highly qualified expert in his own right, with a doctorate in civil engineering from Colorado State University, with emphasis in water resources, fluid dynamics, and hydrology." Colo. Closing Well Br. at 151. His full qualifications are found in Kansas Exhibit 634.

> More specifically, the objective of this report is to quantitatively evaluate the effects of wells on stream flows, diversions, and river gain (or loss) in the reach of the Arkansas River between Canon City and the State line." Jt. Exh. 94 at 2.

The report concluded:

> "The rapid growth of high-capacity irrigation wells tapping the alluvial aquifer of the Arkansas River Valley in southeastern Colorado during the late 1940's, 1950's and early 1960's has decreased the amount of river water available for surface water appropriators." Jt. Exh. 94 at 1.

Danielson testified at the trial that he still agreed with that statement. RT Vol. 76 at 88.

The report also states, "The increasing use of ground water for irrigation in the Arkansas River basin since 1950 has affected stream flows in such a way as to deprive senior water users of a portion of their lawful water supply." Jt. Exh. 94 at 53. According to the report, "excessive pumping" from the Arkansas River alluvium has caused a "decrease in stream flows below Canon City." *Id.* at 53. Danielson testified during the trial here that he still agreed also with that conclusion. RT Vol. 78 at 85.

For the period 1965-72, the report states that the reduction in return flows between Canon City and the Stateline, and the decrease in diversions, averaged 112,800 acre-feet per year, which was "equivalent to the consumptive use of well water" and phreatophytic losses.

Jt. Exh. 94 at 53. Considering the data now available, Danielson testified that the 112,800 acre-foot figure might be a "bit high," but "does not appear outlandish." RT Vol. 78 at 87. However, he cautioned that it does not translate directly into Stateline depletions. That report did not consider possible offsets to the impact of groundwater pumping on Stateline flows, such as transmountain return flows, or forced reductions in surface diversions in Colorado that might cushion the impact at the Stateline.

The importance of this report is underscored by a 1987 letter from Myron B. Fiering, one of Colorado's most distinguished experts, written to another member of the Colorado trial team.[50] Dr. Fiering wrote:

> "The 1975 Danielson Report – *the one we all wish had never been written* – has a basin model whose complexity is, in my view, just about right. . . . The only problem I have with the Danielson Report is that *its unhappy conclusion might be unassailable* without a more detailed model – and a more detailed model implies more parameters and more equations, all of which render the results more subject to error . . . a real Hobson's choice!" Kan. Exh. 674 at 3. (Emphasis added).

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[50] Dr. Fiering, now deceased, was one of the most distinguished scientists in America. At the time of his testimony he was the Gordon McKay Professor of Engineering and Applied Mathematics at Harvard University, having been a member of the Harvard faculty since 1961. RT Vol. 109 at 99. His exceptional curriculum vitae is found in Colorado Exhibit 665. Dr. Fiering was one of the experts assembled by Colorado to advise the state in the development of its water budget analysis.

J. The Colorado Supreme Court Decision on Amended Rule 3.

In its opinion on the Amended Rule 3, the Colorado Supreme Court noted evidence before the Water Court that well pumping in 1972 exceeded 200,000 acre-feet; and that an estimated 2 million acre-feet of water is generally held in transient storage within the river alluvium. *Kuiper v. Atchison, Topeka & Santa Fe Ry. Co.*, 195 Colo. 557, 581 P.2d 293 (1978). The Court pointed out, however, that a restriction of well pumping does not necessarily result in a comparable increase in the supply of surface water. The Court cited many factors that can offset or modify the depletive use of well water: changes in groundwater storage; reduction in phreatophytic losses resulting from lowering the groundwater table; increased irrigation efficiencies; and variations in the amount of river flow. But in the final analysis the Supreme Court struck down the amendment because it did not rest upon real operating experience and an evaluation of operations under the 1973 rules. 581 P.2d at 297.

The Water Court had found that there was no evidence that the amendment "was required to prevent material injury to vested senior rights at the time of a senior need." *Id.* at 296. The Supreme Court approved this ruling. It also characterized the amendment as a "drastic change," that under the circumstances was in conflict with legislative policy that:

> "Ground water diversions shall not be curtailed nor required to replace water withdrawn, for the benefit of surface right priorities, even though such surface right priorities be senior in priority date, when, assuming the absence of ground water withdrawal by junior priorities, water would not have been available for diversion by such surface right under the priority system." *Id.* at 296-97.

In short, the Supreme Court found that there was a duty upon the state engineer, before adopting the amendment, to determine that it would make additional water available for senior priorities, when needed. He did not do this, and could not do so, said the Court, because he did not yet know the effects of the 1973 rules. *Id.* at 297. Although the Court's decision was made in 1978, there has been no subsequent effort to amend the 1973 rules, which remain in effect today as the regulations for the control of groundwater pumping.

K. Policies Affecting the 1973 Rules.

Danielson and Simpson testified extensively about the policies that went into the formulation and administration of the 1973 rules.

(a) To begin with, they understood that a strict administration of the priority system "would result in shut-off of nearly every well that existed in the state." RT Vol. 76 at 25-26. The state engineer's office did not believe that the legislature intended it to "go out and put them all out of business." RT Vol. 76 at 37, 34.

(b) The state engineer's office also recognized the economic importance of preserving well pumping. Danielson testified that if the appropriation system were strictly implemented it would "bankrupt the eastern third of the state of Colorado." RT Vol. 76 at 39. The thrust of the state engineer was "not to go out and destroy

the economy." *Id.* at 26. "The idea was to save those wells, keep that economy alive." RT Vol. 77 at 64.

(c) Colorado faced a "very delicate balancing act," that is, to maximize use and still adhere to the priority system. *Id.* The approach chosen by the legislature, according to the state engineer, was "the maximum utilization concept, consistent with the priority system. RT Vol. 76 at 39. The state engineer saw the provisions of the 1969 Act regarding maximizing use as a "mandate." RT Vol. 77 at 35.

(d) Maximum use was sought through the use of groundwater and the alluvial groundwater storage capacity. *Id.* at 34-35. In turn, this meant employing the "reasonable lessening of injury" test for the protection of prior vested rights. RT Vol. 76 at 26, 29, 33. This is the test enunciated by the Supreme Court in the *Fellhauer* case, as opposed to the prevention of material injury. *Fellhauer*, 447 P.2d 986 at 993.

(e) The approach of curtailing pumping no more than four days a week had no "scientific basis," but rather was an "arbitrary approach" that was easily understood and administered. RT Vol. 76 at 28-29. However, at the time the state engineer believed that the four-sevenths curtailment provided a reasonable lessening of injury, and would give well owners an incentive to take advantage of the other aspects of the 1969 Act, namely, exchanges, substitute supply plans, and plans for augmentation. *Id.* at 26, 39.

In addition to the statutory and quasi-judicial duties that have been discussed, the state engineer since 1969

has been charged with the specific responsibility of making and enforcing such regulations as may be necessary to enable Colorado to meet its compact commitments. C.R.S. 1963, § 148-11-24, now C.R.S. § 37-80-104, 15 C.R.S. provides:

> "The state engineer shall make and enforce such regulations with respect to deliveries of water as will enable the state of Colorado to meet its compact commitments. In those cases where the compact is deficient in establishing standards for administration within Colorado to provide for meeting its terms, the state engineer shall make such regulations as will be legal and equitable to regulate distribution among the appropriators within Colorado obligated to curtail diversions to meet compact commitments, so as to restore lawful use conditions as they were before the effective date of the compact insofar as possible."

Dr. Danielson testified that the 1973 rules were not promulgated under this provision of the law. He said, "They are not intended to establish standards for administration within Colorado to meet terms of the Arkansas Compact, no. They are intended to govern the appropriation of groundwater in the Arkansas Valley." RT Vol. 76 at 85. Nor have rules to ensure compliance with the compact ever been prepared for the Arkansas River. He testified that it had not been done ". . . because it was never determined necessary to define an intrastate administrative scheme to meet that obligation." *Id.* at 86.

I have seen little in the extensive record of Colorado legislation, studies, reports, regulations and judicial decisions of this time affecting flows in the Arkansas River that appears to recognize Kansas' compact interest.

L. Augmentation Plans Under the 1973 Rules.

The 1969 Act provides for plans of augmentation, which were defined as follows:

> ". . . a detailed program to increase the supply of water available for beneficial use in a division or portion thereof by the development of new or alternate means or points of diversion, by a pooling of water resources, by water exchange projects, by providing substitute supplies of water, by the development of new sources of water or by any other appropriate means." Colo. Exh. 385 at 1202.

Based upon that legislative authority, the 1973 rules of the state engineer provide for an exemption from the four-sevenths curtailment. The rules require a written plan approved by the division engineer ". . . whereby the amount of the depletion from the stream by said well or wells will be returned to the stream so that prior vested rights are not damaged." Jt. Exh. 93 at 2. Under these circumstances, wells that are included in such an approved plan are exempt from any pumping curtailment. RT Vol. 77 at 110; Kan. Exh. 40, Doc. 59 at 2.

In Water District 67, which includes the area between John Martin Reservoir and the Stateline, the ditch companies organized a group known as the Lower Arkansas Water Management Association. RT Vol. 76 at 49. This

association, referred to generally as LAWMA, included on the order of 300 to 350 wells. *Id.* at 80.[51] The purpose of LAWMA was to develop a plan that would permit those wells to pump without restriction. RT Vol. 77 at 54.

Ultimately, with assistance from the state, the local association developed the Buffalo Canal Demonstration Project. Kan. Exh. 40, Docs. 15, 19, 24, 29, 49, 59. The project called for constructing eight wells along the Arkansas River, downstream from the headgate of the Buffalo Canal, having a capacity of not less than 25 cfs. *Id.* This water was then to be pumped into the Buffalo Canal and laterals to help offset depletions in the surface flows of the Arkansas River. RT Vol. 76 at 111-12; RT Vol. 77 at 110. These depletions were caused by "wells owned by Association members." Kan. Exh. 40, Doc. 59 at 1. Thus, the project did nothing more than use groundwater pumped from new wells downstream to help offset stream depletions caused by older wells upstream. RT Vol. 76 at 135; RT Vol. 16 at 77-78. Yet this project was approved by the state engineer as a "substitute supply" plan under the 1969 Act. RT Vol. 77 at 50-52.

The stated purpose of the project was to utilize "the unappropriated ground water below the Buffalo Canal headgate." Kan. Exh. 40, Doc. 59 at 1. It provided "much needed irrigation water" during the unusually dry period of 1974-78. *Id.* at 2. Moreover, association members were permitted "to pump unrestricted throughout the irrigation season." *Id.* According to the state engineer, the

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[51] Other testimony put the number of wells at about 400, or about 80% of the total downstream from John Martin Reservoir. RT Vol. 77 at 57.

benefits of this "management plan" were considerable "since so much of the economy is dependent upon irrigation water from alluvial wells." *Id.*

The eight demonstration project wells were located in the sixteen-mile reach between the last Colorado surface diversion and the Stateline. Only Kansas users could be affected by this pumping, but the impact on Stateline flows "was never a consideration." RT Vol. 77 at 83. The only constraints contemplated were those imposed by "economics and hydrogeology." Kan. Exh. 40, Doc. 11. Moreover, in this general area there were 50 to 60 post-1972 wells permitted by the state engineer. RT Vol. 76 at 127. Under the 1973 Rules, these wells would not have been allowed to pump even three days a week unless they were included in an augmentation plan. *Id.* at 126-127. Thus, LAWMA freed even these wells from restrictions if they were operated by members of that association.

Moreover, by substituting groundwater for surface flows, the Buffalo Canal, which holds a very senior right, freed up surface water for diversion by junior ditches upstream. RT Vol. 77 at 61. The LAWMA "augmentation" project thus added to the consumptive use of water in Colorado, but not to the common supply of the Arkansas River and its tributary groundwaters.

The eight demonstration project wells went into operation between 1975 and 1978, but ceased to operate in 1983. *Id.* at 102. In more recent times, LAWMA has begun to lease stored water in John Martin, and has purchased outright one small 6.5 cfs surface diversion right. *Id.* at 105-06. While this direction appears to be

more in line with the intent of the 1969 Act, no evidence was presented on the specific amounts of water involved.

In the area upstream from John Martin, another association has been formed, called Colorado Water Protective and Development Association. Like LAWMA, its purpose is to provide an augmentation plan that will protect its members from well curtailment. RT Vol. 78 at 25-26. Membership in this association is in the order of 700 to 800 members. RT Vol. 76 at 50; RT Vol. 78 at 45. This association has been making yearly arrangements with the division engineer to purchase limited amounts of "return flow" from transmountain imports. RT Vol. 78 at 26-29. However, the amounts appear small. Generally, they have been in the order of 10,000 acre-feet or less. RT Vol. 16 at 65.

A 1981 example shows that the members would need 18,764 acre-feet of groundwater to meet their full crop demands. RT Vol. 78 at 47. After various calculations, the report submitted to the division engineer concludes that the replacement requirement should be only 2,742 acre-feet. *Id.* at 48.

According to Colorado data, total pumping in Reach 3 in 1981 was approximately 133,000 acre-feet. Yet water provided for augmentation was only in the order of 7000 acre-feet. *Id.* at 61. Danielson acknowledged that 7000 acre-feet would not offset the streamflow depletions arising from some 133,000 acre-feet of pumping, but he pointed out that the 133,000 figure is a total for all wells in Reach 3, not merely those within the association. In any event, Danielson testified that there was not a "one

for one" replacement, but that he thought the replacement requirement was adequate under the rules and regulations. *Id.* at 53. He testified that the state engineer continually urges the association members "to be more sophisticated and to obtain more assets as they are able." *Id.* at 53.

The evidence showed that at least as late as 1983 the association had not developed and sought approval of a permanent plan of augmentation, although urged to do so by the division engineer. Kan. Exh. 41, Docs. 33, 35; RT Vol. 16 at 69. Rather, it operated on the basis of one-page annual letters simply listing the sources and sometimes the amounts of water to be obtained. In 1982, for example, it listed 1500 acre-feet of return flow from the Southeastern Water Conservancy District; 500 acre-feet of purchased transmountain water; the return flow from 5794.32 shares of Twin Lakes water; and the return flow from approximately 4000 acre-feet imported by the High Line Canal Co. Kan. Exh. 41, Doc. 25. The latter two sources did not indicate the amount of the actual return flow. Nor does it appear that the amount of the well depletions being addressed was ever calculated. RT Vol. 16 at 70-73; Kan. Exh. 41.

The division engineer sought more detail in the place, time, rate and amount of return to the Arkansas River for each of these sources, but the reply was as skimpy as the original data. Kan. Exh. 41, Docs. 26, 27. Some of these sources were also found later to be unacceptable by the division engineer because other users already held vested rights to the return flows. *Id.*, Docs. 34, 35. Nonetheless, it appears that these meager annual arrangements permitted all 700 or so members of the

association to pump without limit seven days a week. RT Vol. 16 at 73.

M. Conclusions.

Colorado allowed hundreds of wells to be constructed in the river alluvium without regard to their impact upon the surface flows of the Arkansas River, either in Colorado or in Kansas. Data on the number of wells and magnitude of their pumping were not generally known until the studies of the mid- to late 1960s. Yet postcompact pumping in Colorado clearly depletes the surface flows of the Arkansas River. While many of the studies showing such depletions covered the river from Pueblo *to* the Stateline, it is difficult to conceive that flows *across* the Stateline were not also depleted.

Colorado's efforts to regulate pumping were heavily tempered by its own economic considerations. The adopted concept of obtaining "maximum use" of the waters of the state through the pumping of groundwater ignored the downstream impact in Kansas and the rights of Kansas under the compact. Regulation under the 1973 Rules has not effectively reduced pumping, although perhaps pumping would have been even greater without such control. Nor does the evidence show that the augmentation plans have significantly offset the depletions from wells. Under appropriate circumstances, the conjunctive use of surface diversions and groundwater pumping can effectively increase available water supply, but any such effort cannot be focused solely on the benefits to Colorado users as though they are entitled to

consume the full supply. If a program of limited conjunctive use has any potential along the Arkansas (and there was no evidence on this matter during the liability phase of the trial), the program must also include Kansas' rights under the compact.

SECTION XII

DEPLETIONS OF STATELINE FLOW

The actual quantities of water in the Arkansas River flowing into Kansas are not in dispute. Stateline flows are gaged by the United Stages Geological Survey, and adjusted for diversions made by the Frontier Ditch just across the border in Colorado and delivered for use in Kansas. Stateline flows, as adjusted, for the period 1950-85 are set forth in the tables below. These amounts represent total annual flows, not usable flows. They include flood flows for years like 1965 when measured quantities reached 749,070 acre-feet, compared to a 1950-85 annual average of 144,051 acre-feet. The figures set forth below are for compact years, which run from November 1 to October 31.

The quantities of water in the left-hand column are those presented by Colorado.[52] Those in the right-hand column were tabulated by the United States, but based on Kansas data.[53] Kansas itself did not prepare a table of annual Stateline flows, but presented its data only in bar graphs and similar exhibits. While the amounts in the two columns are not identical, they are so close that total numerical flows have not been an issue.[54]

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[52] Taken from Colo. Exh. 4*, Table 5.8.

[53] Taken from U.S. Exh. 12.

[54] Colorado expert Helton testified that these Colorado data from Colorado Exhibit 4*, Table 5.8, were not in question, and Kansas never disputed this claim. The differences may result from the use of slightly different periods of time.

YEAR	COLORADO DATA	KANSAS DATA
1950	193214	
1951	278941	278854
1952	107524	107050
1953	99354	99355
1954	102055	102147
1955	155009	155021
1956	97596	97405
1957	178131	178106
1958	164122	164112
1959	199460	199340
1960	125301	124862
1961	105791	105715
1962	124762	124872
1963	67709	67726
1964	81340	81155
1965	749070	749058
1966	277191	277151
1967	216221	216372
1968	114824	114480
1969	143634	143650
1970	140272	140290
1971	113502	113622
1972	117682	117409
1973	118007	118120
1974	61709	61814
1975	44454	44417
1976	32363	32250
1977	30745	30756
1978	43486	43547
1979	19805	19775
1980	127174	127148
1981	63569	63575
1982	82224	82101
1983	166953	166889

1984	197299	196905
1985	245354	245335
	Average 1950-85: 144051	Average 1951-85: 142582

A. Precompact Flows.

There is no doubt that Stateline flows in the postcompact years have averaged less than the flows in earlier years. During the compact negotiations, the engineering committee used the period of 1908-42 for the collection and analysis of data. Stateline flows during that period averaged 280,800 acre-feet annually. Jt. Exh. 5, Table D, at 16. Even during the dry period of 1931-40, Stateline flows averaged 146,200 acre-feet annually, thus exceeding the postcompact period, which includes some very wet years. *Id.* The 1944 proposal by Chief Engineer Patterson of the Colorado Water Conservation Board was based upon average flows for 1908-38 amounting to 260,700 acre-feet annually. Jt. Exh. 8 at 22. The 1968 W. W. Wheeler Report authorized by the Colorado legislature puts average Stateline flows for 1924-41 at 194,250 acre-feet per year, and for 1943-50 at 237,160 acre-feet. Jt. Exh. 92 at 14-15. This report carefully eliminated from its averages the enormous flows of 1942 which amounted to 1,317,590 acre-feet. *Id.* at 14, 17. The 1975 report prepared by the Colorado state engineer showed average Stateline flow for 1935-50 of 280,900 acre-feet per year. Jt. Exh. 94 at 49. In short, all of the studies of precompact flows showed amounts that were substantially greater than those occurring during the postcompact period.

A simple comparison, however, between precompact and postcompact flows can be misleading. John Martin Reservoir must be taken into account. That reservoir went into operation just before the compact was finalized, and it was always known and intended that John Martin would alter the regimen of river flows. The conservation pool was specifically designed to store flows that otherwise would have reached the Stateline but would have been unusable. It was well understood that under the compact Colorado would receive roughly 60 percent of the conserved water, with the remainder being available for use in Kansas.

The issue now, however, is whether the reduction of flow into Kansas has been greater than it should have been, or more precisely, whether activities in Colorado have caused a material depletion of usable Stateline flows.

B. Postcompact Depletions.

Colorado has never denied the fact that postcompact flows at the Stateline have declined.[55] Even apart from comparisons with earlier years such as 1908-42, it is evident that Stateline flows have declined since the adoption of the compact. Looking at the early postcompact years from 1950-64, Stateline flows averaged 138,687 acre-feet annually.[56] While in the later 1966-85 period, the average fell to 117,823 acre-feet per year, or a loss of almost 21,000

[55] See, e.g., RT Vol. 114 at 115-116.

[56] Computed from Colorado Exhibit 4*, Table 5.8, and the table set forth above.

acre-feet annually. (In this comparison I have simply omitted the flood year of 1965 because of its abnormal flows of 749,070 acre-feet.)

Colorado takes issue with Kansas, however, over the causes of the decline. Colorado's expert Duane D. Helton[57] testified that the depletion has been the result of a combination of causes: decreased flow from the tributaries, increased use by phreatophytes, and "partly" from well pumping. RT Vol. 114 at 116. Colorado's state engineer also acknowledged that the 76 wells constructed after 1965 in the Buffalo Canal area depleted Stateline flows. RT Vol. 77 at 23-26; see also Miles testimony, RT Vol. 66 at 47. However, trying to calculate what usable Stateline flows would have been in the absence of the compact violations alleged by Kansas (namely, postcompact pumping in Colorado and the WWSP) is a most formidable task.

Both states used computer models in an effort to isolate the impacts of postcompact well pumping and of the Winter Water Storage Program. Helton agreed there was a trend of increase in depletions of Stateline flows as a result of higher pumping, and that the highest depletions occurred in the mid- to late 1970s. RT Vol. 133 at 57-58. This evidence is discussed at length in Sections

[57] Mr. Helton was one of Colorado's principal expert witnesses. He holds a master's degree in water resources engineering from the University of Colorado, and worked for 11 years as an engineer with the Colorado Water Conservation Board. Since 1982 he has been with Tipton and Kalmbach, Inc. of Denver, and is now vice president of that firm and chief of its water rights section. Probably no witness was more knowledgeable about all facets of the Arkansas River than Mr. Helton.

XVIII, XIX and XX. However, Colorado asserts certain legal defenses which first need to be addressed. Colorado argues (a) that Kansas should be barred by laches from asserting any claims for well pumping which occurred prior to 1965, and (b) that the impact from pumping below John Martin Reservoir should be offset by benefits to Kansas resulting from the 1980 Operating plan. As part of the argument on the Draft Report, alternate modifications to both of these positions were put forward. These two issues are next analyzed.

SECTION XIII

EQUITABLE DEFENSES

A. Colorado's Claim.

In its Answer to Kansas' First Amended Complaint, Colorado raised affirmative defenses of laches, estoppel, waiver and unclean hands. In Colorado's post-trial briefs, acquiescence was added. However, Colorado states that it has not tried to "pigeonhole" Kansas' actions under any of these labels. Colo. Closing Well Br. at 44. Rather Colorado has focused on those factors which traditionally have been considered by courts of equity in rendering judgments. To that end, Colorado argues that Kansas should be barred from complaining about the effects of well development that occurred prior to 1965. It is undisputed, Colorado asserts, that Kansas did not complain about well development in Colorado until 1985, although the facts had been common knowledge since at least the mid-1960s.

In the alternative, Colorado asserts that Kansas' delay must "gravely add to the burden [it] would otherwise bear, and must be weighed in estimating the equities of the case." Colo. Closing Well Br. at 49, quoting from *Colorado v. Kansas*, 320 U.S. 383 at 394.

As part of the argument on the Draft Report, Colorado urged an alternate approach to laches that "would produce a fairer result." Colo. Oral Argument Memorandum at 2. Instead of aiming at well construction, Colorado suggested that the focus be on well pumping, and that such pumping be treated in the nature of a continuing nuisance. *Id.* at 4. Viewed in that light, Colorado

argued that laches might bar damages for pumping through the mid-1970s, which had occurred without complaint, but not the "increased well pumping which occurred in later years." *Id.* at 4-5. To accept this argument, Colorado stated, would not produce a bar to any prospective remedy. RT Vol. 142 at 110.

Colorado initially alleged prejudice in two respects. First, that Kansas' failure to complain in a timely fashion has made it difficult for Colorado to defend itself and to determine key factual issues because of a lack of data from the early years. Colorado points particularly to the lack of data on groundwater pumping and water levels before 1965, the amount of inflow from ungaged tributaries, and the flows passing Garden City from 1970-85. However, I doubt that complaints from Kansas realistically would have made any difference in Colorado's data collection system. I note that the 1968 W. W. Wheeler Report which was authorized by the Colorado legislature recommended that "Accurate and continuous discharge records be obtained of major tributary inflow," and that "Recorders be installed on all wells." Jt. Exh. 92 at vii. Yet nothing substantial was done. Indeed, these recommendations still have not been implemented.

Insofar as Colorado complains about a lack of data for the early years, it should also be remembered that before 1965 Colorado had no administrative system for the regulation of wells. Moreover, it was not until 1957 that any kind of well registration system was enacted. Prior to that date, wells could be and were constructed without the knowledge of the state. And even after 1957,

the issuance of a well permit was a ministerial act without consideration of any impact on prior vested rights. RT Vol. 76 at 25, 106.

Colorado's second claim of prejudice is that Kansas allowed a valuable economy to develop based on the use of irrigation wells to supplement surface supplies. Without complaint from Kansas for more than twenty years, Colorado alleges, investments were made to construct wells, install pumps, line farm ditches, and level land based on the use of irrigation wells. (This claim is dealt with in Section C.2 below.)

With respect to a bar against damages for pumping before the mid-1970s, Colorado argues that Kansas' failure to complain allowed Colorado to act in a way thought to be acceptable, in essence depriving Colorado of the opportunity to mitigate damages. RT Vol. 142 at 110-11.

B. The Availability of Equitable Defenses as a Matter of Law.

Kansas contends that laches is not applicable in this type of case. Laches is of course a doctrine of equity jurisprudence. It is well recognized that this defense requires more than mere delay; there must also exist some prejudice to the other party which has resulted from the delay, so that it would be unfair – inequitable – to allow the claim. See *Tustin Community Hospital, Inc. v. Santa Ana Community Hospital Ass'n.*, 89 Cal.App.3d 889, 895-96, 153 Cal.Rptr. 76, 80-81 (1979); 30A CJS 353 (Equity § 129): "Laches is such delay in enforcing one's rights as works disadvantage to another." Later in this report the

question whether there has been such prejudice is discussed, but first it is appropriate to consider whether laches is available to Colorado at all.

No interstate compact enforcement case has been found in which the Supreme Court has directly held that laches does or does not apply. One of the arguments in favor of the applicability of laches is based on the fact that the Court has described its jurisdiction in these cases as "basically equitable in nature." *Ohio v. Kentucky*, 410 U.S. 641, 648, 35 L.Ed.2d 560, 567, 93 S.Ct. 1178 (1973). But there is a major exception to the applicability of laches, even in equity cases; it is generally held not to apply against a public agency. *Utah Power and Light Co. v. United States*, 243 U.S. 389, 409, 61 L.Ed. 791, 818, 37 S.Ct. 387 (1917); 30A CJS 358 (Equity § 131). This is especially true of disputes at the state or national level. *Utah Power and Light Co. v. United States, supra*, 243 U.S. at 409, 61 L.Ed. at 818; *Illinois v. Kentucky*, 500 U.S. 380, 114 L.Ed.2d 420, 430, 111 S.Ct. 1877 (1991). The rationale is often said to be that the public interest should not be penalized by the inattention of public officers. Although there are decisions allowing laches against public interests, especially in cases involving municipal corporations or administrative agencies, or where exceptional prejudice is involved (30A CJS 358 [Equity § 131]), it continues to be the rule that states are generally exempt. *Id.*

It would be a mistake, however, to decide the issue solely on the basis of conventional equity rules. In establishing the Supreme Court's original jurisdiction over litigation between states, the constitution does not speak of "cases in law or equity," as it does in certain other situations. Rather it refers simply to "controversies"

between states. Commentary on the difference between cases and controversies has been inconsistent and inconclusive (see 36 CJS 20 [Federal Courts § 1]; 1A CJS 302, 315, 316 [Actions §§ 1, 5c, 6]), but the constitutional language does suggest that the interstate jurisdiction is not necessarily locked into rules of either common law or equity. And in exercising this "unprecedented" grant of judicial power (Charles Warren, "The Supreme Court and Sovereign States," [Stafford Little Lectures for 1924], Princeton Univ. Press, p. 32), the Court has treated it as sui generis – a substitute for the treaty and war powers which the states surrendered when the constitution was established. *Rhode Island v. Massachusetts*, 37 U.S. (12 Pet.) 657, 725, 9 L.Ed. 1233, 1260 (1838); *Kansas v. Colorado*, 185 U.S. 125, 140, 46 L.Ed. 838, 844, 22 S.Ct. 552 (1902); *North Dakota v. Minnesota*, 263 U.S. 365, 372-73, 68 L.Ed. 342, 345, 44 S.Ct. 138 (1923); *Idaho v. Oregon*, 462 U.S. 1017, 1031, note 1, 77 L.Ed.2d 387, 400, 103 S.Ct. 2817 (1983).

As Chief Justice Taney explained in 1855, traditional chancery practice is an "analogy" in these cases but is not controlling. *Florida v. Georgia*, 58 U.S. (17 How.) 478, 492, 15 L.Ed. 181, 189 (1855). Thus viewed, the inquiry really is one of fundamental justice rather than what is the historical or even the current practice of courts exercising less extraordinary powers. It is in this sense that the Court has observed that proceedings under its original jurisdiction are "basically" equitable in nature. *Ohio v. Kentucky, supra*, 410 U.S. at 648, 35 L.Ed.2d at 567, 93 S.Ct. 1178 (1973).

The Supreme Court has referred to a broad policy in interstate boundary disputes disfavoring the untimely assertion of rights (see *Illinois v. Kentucky, supra*, 500 U.S.

at 388, 114 L.Ed.2d at 431, 111 S.Ct. at 1883 (1991)), but that policy has been asserted in other situations as well. Thus, in a nuisance action involving sewage contamination of the Mississippi River, Justice Holmes observed that it would be "contradicting a fundamental principle of human nature to allow no effect to the lapse of time, however long." *Missouri v. Illinois*, 200 U.S. 496, 520, 50 L.Ed. 572, 578, 26 S.Ct. 268 (1906). And, as noted above, the Court held in *Colorado v. Kansas*, 320 U.S. 383, 394, 88 L.Ed. 116, 124, 64 S.Ct. 176 (1943), that Colorado's improvements and Kansas' inaction in the twenty-one years following the 1907 Arkansas River decision "gravely add to the burden [Kansas] would otherwise bear and must be weighed in estimating the equities of the case." See also *Washington v. Oregon*, 297 U.S. 517, 528, 80 L.Ed. 837, 843, 56 S.Ct. 540 (1936). Clearly, although it is not based on equity jurisprudence as such, the rule to be followed here is that there is some point at which unexcused delay by a state in connection with an interstate apportionment will work to bar relief.

In applying such a principle, it should be borne in mind that no statute of limitations is applicable in this case, and therefore there is no outside limit to the period during which delay will be tolerated. The test should not be any particular number of years, but rather the degree of prejudice to the state claiming laches. *Tustin Com. Hosp. v. Santa Ana Com. Hosp., supra*, 89 Cal.App.3d at 895-96, 153 Cal.Rptr. at 80-81; 30A CJS 353 (Equity § 129).

C. The Facts Do Not Support a Claim of Laches or Other Equitable Defense.

Colorado seeks to bar relief based upon impacts from wells drilled before 1965. This would include almost all of the wells in existence in 1985. According to Colorado's own data, in 1985 there were 2062 large irrigation wells with a capacity of 100 gpm or more. Colo. Exh. 165*, Table A.1. Of that total, 1842 were in existence before 1965. *Id.* According to Colorado, Kansas did not register any formal complaint until 1985. Colo. Closing Well Br. at 13, 44; RT Vol. 78 at 109; RT Vol. 115 at 63-64. This assertion is essentially correct.

1. The Timing of Kansas' First Complaint Against Pumping.

On March 28, 1985, at the instance of Kansas, the compact administration pursuant to Article VIII-H undertook a formal investigation of compact violations alleged by Kansas. Included in the investigation were the issues of whether "well development of the waters of the Arkansas River in Colorado," and the operation of the Winter Water Storage Program had caused a material depletion in river flows. Jt. Exh. 28. In late 1983 Kansas had undertaken its own study of Stateline depletions through the firm of Simons, Li & Associates. The actual work was done largely by Brent E. Spronk and Dale E. Book, both of whom later became principal witnesses for Kansas at the trial. The Simons, Li report was completed in February, 1984 and made available to the compact administration. Jt. Exh. 19, Minutes of 3-28-85 at 99-100. That study concluded that a conservative estimate of

Stateline depletions due to postcompact wells for the 1974-81 period was between 40,000 and 50,000 acre-feet per year. Jt. Exh. 88 at v. Prior to this time, however, the records of the compact administration reflect very little about the impact of postcompact well development in Colorado.

The minutes of December 14, 1976 include a brief remark from a member of the audience. Stating that 25 additional wells were being put in along the Kansas line, he commented, "so I don't know whether you are ever going to get any water to the Kansas line again or not." Jt. Exh. 19, Minutes of 12-14-76 at 74.

The first extensive consideration of pumping impact shows up in the minutes of April 23, 1977. And then it came not from Kansas but rather from Harry L. Bates, one of the compact commissioners from Colorado. Bates represented Water District 67, the area downstream of John Martin Reservoir, which of course has some interests similar to those of Kansas. He submitted an "Historical Data" report which compared two ten-year periods of postcompact operations. Jt. Exh. 19, Minutes of 4-23-77 at 39-50. The report concluded that average storage in John Martin Reservoir had declined by more than 54,000 acre-feet annually, and that the decline could not be explained by weather changes. The four causes which, "in bitter fact," had caused the depletion were listed as: a heavy increase in upstream winter irrigation; a "proliferation of wells pumping from the aquifer hydraulically connected to the live river stream above John Martin"; the transfer of some agricultural rights to municipal and industrial

use; and the re-regulation of river flow by Pueblo Reservoir. Jt. Exh. 19, Minutes of 4-23-77, Historical Data report.

Bates' report was taken up again at the December 13, 1977 meeting, but nothing appears to have come of it. The comment was made at that meeting that most of the items in the report were either outside of the compact administration's jurisdiction, or were before the courts, or were being studied and resolved by other authoritative agencies. Jt. Exh. 19, Minutes of December 13, 1977, at 6. The compact leaves the primary administration of water rights with the states. Article VI-A(2).

There was also discussion of a pending agreement between the City of Lamar and Iowa Beef Producers, Inc. for the purchase of land and water rights in the Lamar area. The minutes state:

> "The Compact Administration was concerned that there might be more wells drilled and thus further deplete the river water." Jt. Exh. 19, Minutes of 12-12-78 at 8.

In regard to possible supplemental wells, the minutes reflect an explanation that "applications would have to be made to the Water Court for permit of augmentation" and that the division engineer did not anticipate any new wells being drilled. *Id.*

With these exceptions, I have found nothing in the record of the compact administration proceedings from 1950 to 1985 that reflects any complaint by Kansas about pumping in Colorado. The record supports Colorado's assertion that no formal complaint to the compact administration, or indeed to any appropriate Colorado officials,

was made before 1984 (if the Simons, Li report is considered as such) or otherwise before 1985, when Kansas asked the compact administration to undertake an Article VIII-H investigation.

2. The Need to Show Prejudice.

Laches does not result merely from the passage of time. The defendant must be prejudiced by the delay. *Gardner v. Panama Railroad*, 342 U.S. 29, 96 L.Ed. 31, 72 S.Ct. 12 (1951); *Southern Pacific Co. v. Bogert*, 250 U.S. 483, 63 L.Ed. 1099, 39 S.Ct. 533 (1919); *Russell v. Todd*, 309 U.S. 280, 84 L.Ed. 754, 60 S.Ct. 527 (1940). Here the farmers in Colorado after 1950 drilled new wells and expanded the use of older wells without the official knowledge of either Colorado or Kansas. They relied upon Colorado law as it then existed, not upon inaction by Kansas. Prior to 1957 a well could be drilled in Colorado without any state permit, and without the knowledge of the state. Colorado did not even begin to collect well data until 1957. RT Vol. 76 at 101. Even then, it had no program for reporting or determining the amount of water pumped. In *Kuiper v. Atchison, Topeka & Santa Fe Ry. Co.*, 195 Colo. 557, 581 P.2d 293 (1978), the Supreme Court of Colorado stated:

> "Prior to the adoption of the 1973 Rules, there had been virtually no regulation of wells in the basin, and consequently no empirical data as to the effect upon surface rights in the basin of regulation of wells." Colo. Exh. 387 at 296.

There is no evidence in the record that Kansas knew, or should have known, of the extent of postcompact well pumping in Colorado until virtually all of the additional

wells had been constructed. Nor is there any evidence that farmers in Colorado knew that Kansas had any interests that might be affected by their pumping. Under Colorado statutes (apart from any consideration of the compact) their well development was lawful. The construction of new wells and the increase in pumping did not occur because Kansas failed to complain, but rather because of the economic value of wells to the Colorado farmers, and the fact that such wells were not wrongful under Colorado law. Wells, in and of themselves, do not violate the compact.

Once the farmers in Colorado, relying upon Colorado law, had made those well investments, the passage of time would not create prejudice. On the contrary, delay or inaction by Colorado or Kansas in bringing about well regulation permitted the benefits of those wells to be increasingly enjoyed and such investments amortized.

Insofar as Colorado further claims prejudice because of the lack of data from the precompact or early postcompact years, I find that such data was simply not being collected at that time. The lack of data suggests that neither state could be expected to have been aware of the effect of pumping. Kansas also makes the point with some merit that the Colorado experts testifying to such pumping did not make any serious complaint about the lack of pre-1965 data. Colo. Exh. 165*; RT Vol. 69 at 51-54; RT Vol. 71 at 5-142; RT Vol. 72 at 4-131; RT Vol. 114 at 19-22, 28, 39. To be sure, power records for 1940-60 were incomplete, and this made the task of estimating pumping more difficult; but missing years were accounted for by using regression techniques, and Helton testified that

Colorado's ultimate pumping estimates were reasonable. Colo. Exh. 165* at 3; RT Vol. 115 at 58.

During the period from 1963 to 1968, the USGS made a "comprehensive evaluation" of the hydrology of the Arkansas River Valley in Colorado. Jt. Exh. 66 at 1. The purpose of the study was "to provide basic information to water users and State and local agencies for the planning, management, and administration of the water resources." *Id.* An actual field inventory of all large scale irrigation wells was conducted. The report, published in 1970 as "Basic-Data Release No. 21," included location maps of wells, the saturated thickness of valley-fill deposits, water level measurements, well records, chemical analyses of water from selected wells, pump data, and pumping estimates over the years beginning in 1940. Certainly the USGS used and collected all the data then reasonably available. If Colorado has suffered any prejudice because of data missing prior to 1963, it is not because Kansas failed to complain about pumping, but simply because the data were not kept. Colorado, however, says the issue is not what data were being collected, but what evidence "would have been available" if a timely complaint had been made. Colo. Oral Argument Memorandum at 16. This argument presupposes that Colorado, in essence, would have done earlier what the USGS did between 1963 and 1968 – a highly speculative assumption.

Colorado also argues that it has been deprived of the testimony of "highly knowledgeable" witnesses who could prove that Kansas acquiesced in upstream well development. Colo. Oral Argument Memorandum at 12. Colorado refers to George Knapp, William Leavitt,

Roland H. Tate and R.V. Smrha who were Kansas' early representatives to the compact administration. All except Smrha died between 1964 and 1967. If the issue involved compact interpretation, the testimony of these leading figures might indeed be useful. But there is no evidence to suggest that these men acquiesced in compact violations. The records of the compact administration are completely devoid of any reference to well pumping in Colorado during this period of time.

3. The Issue of Common Knowledge.

Colorado argues that the facts concerning well development in Colorado were open, notorious and of common knowledge, and that Kansas should have been on notice of the potential impact by the mid-1960s, if not earlier. Colo. Closing Well Br. at 14, 45; Colo. Reply Br. at 8. Colorado cites several reports, two Colorado Supreme Court decisions, and the state's controversial efforts to regulate wells. Jt. Exhs. 66, 78, 91, 92, 94; Colo. Exhs. 384, 387.

Colorado's efforts to regulate wells began in 1965 with enactment of a statute directing the state engineer to administer wells within the priority system. Colo. Exh. 378. The state engineer's initial effort to shut down 39 wells under that statute was set aside in 1968 by the Colorado Supreme Court. Colo. Exh. 384. Neither the 1965 legislation, nor the Court decision, dealt with depletions of flow into Kansas. At the direction of the Colorado legislature, the Wheeler Report was published in 1968. Jt. Exh. 92. That report estimated pumping between 1940 and 1965, showing an increase from 2300 acre-feet in 1940

to a 1960-64 average of 168,200 acre-feet. Jt. Exh. 92 at 22. The report seems to indicate that pumping in the order of 114,000 acre-feet annually would not interfere with an average demand by Kansas during 1951-64 of 42,000 acre-feet per year. *Id.* at 23.

In 1970 the USGS published a comprehensive report on wells along the Arkansas River between Pueblo and the Stateline. Jt. Exh. 66. It found that the groundwater supply was developed mainly from 1950 to 1965 when approximately 1000 large-capacity irrigation wells were drilled. *Id.* at 5. The report estimated that pumping increased from 31,000 acre-feet to 185,000 acre-feet annually in the period 1950 to 1965. *Id.* However, the impact on streamflow was not studied.

Another USGS report was published in 1974. Jt. Exh. 78. This report published the results of a mathematical model simulating the stream-aquifer system of the Arkansas River from Pueblo to the Stateline. While Colorado experts at the trial were critical of the accuracy of this model, it nonetheless simulated Stateline depletions due to well pumping in Colorado during the 1941-65 period of 67,000 acre-feet annually. Jt. Exh. 78, Table 2, compare No. 1 with No. 14; RT Vol. 99 at 56-57.

In 1972 the Colorado state engineer issued regulations limiting pumping to three days a week unless a written plan were approved to protect prior vested rights. Jt. Exh. 93 at 2. Subsequent regulations to curtail all pumping that was not under an approved plan were struck down in 1978 by the Colorado Supreme Court. Colo. Exh. 387; *Kuiper v. Atchison, Topeka & Santa Fe Ry. Co.*, 195 Colo. 557, 581 P.2d 293 (1978). The Court in that

decision acknowledged evidence that pumping exceeded 200,000 acre-feet in 1972, but noted that "the restriction of wells does not necessarily result in a comparable increase in the supply of surface water." *Id.* at 295.

In support of these tighter regulations, the Colorado state engineer prepared a report in 1975. Jt. Exh. 94. He concluded that the rapid growth of irrigation wells during the period from the late 1940s to the early 1960s had decreased the amount of river water available for surface water appropriators, and had deprived senior water users of a portion of their lawful supply. *Id.* at 1, 53. He quantified the reduction for the period 1965-72 at an average of 112,800 acre-feet per year, but testified later during the trial of this case that such reduction would not translate directly into Stateline depletions. *Id.* at 53; RT Vol. 78 at 85.

None of these reports or court decisions deal with the issue of impact on usable flow at the Stateline. Yet wells *per se* are not wrongful under the compact. Only if they cause a material depletion in usable flows would they be in violation. Determining what flows are usable, and the depletions of usable flow in contrast to depletions of total flow, is not simple. In fact, one of Colorado's experts testified that "surplus" water was available through the 1950s and 1960s, and at least during that period there was little impact on usable flows from upstream well development. RT Vol. 115 at 62-64. Moreover, in his opinion, the only feasible way to develop the unused waters of the Arkansas River was through wells, "and that is what both States did." RT Vol. 86 at 78-79; Colo. Closing Well Br. at 22. Apparently the Colorado state engineer continued to grant well permits downstream from John Martin during

the 1970s because he also thought that unappropriated water was still available and Kansas would not be adversely impacted. RT Vol. 76 at 112-115; RT Vol. 81 at 156. However, Danielson, the next state engineer, ceased issuing such permits in 1979 because he believed that further appropriation without a replacement or augmentation plan would cause injury. RT Vol. 76 at 116.

The regulations adopted by the state engineer for the control of wells in Colorado were intended to protect surface water users in Colorado, not flows into Kansas. RT Vol. 76 at 117-120. The state engineer was under a specific statutory duty to make and enforce such regulations as would enable the State of Colorado to meet its compact commitments. C.R.S. § 37-80-104. However, Dr. Danielson said that no such rules had ever been prepared for the Arkansas River "because it was never determined necessary to define an intrastate administrative scheme to meet that obligation." RT Vol. 76 at 86, 120.

Isolating the impacts of wells on usable Stateline flow was made all the more difficult because of other changing conditions during the 1970s and early 1980s. The 1970s were generally dry years and some reduction in flow was to have been expected. Pueblo Dam came on line in 1976 and began to reregulate native flows. Transmountain imports increased, which to some extent provided an offset to pumping. The 1980 Operating Plan was placed into effect, which Colorado alleges offset the impacts of increased pumping downstream from John Martin Reservoir. The Winter Water Storage Program was instituted. Moreover, there was no quantitative or specific entitlement against which depletions to usable flow could be

judged. Nor were there any agreed upon criteria for establishing what flows were usable.

Indeed, as late as 1985, a key Colorado representative took the view that acknowledged declines in usable Stateline flows were not caused by pumping, but rather appeared to result from other factors. In a report dated October 4, 1985, made to the compact administration pursuant to its Article VIII-H investigation, J. William McDonald, one of the Colorado compact commissioners, acknowledged that there had been "a substantial decline in usable stateline flows starting in 1974." Jt. Exh. 32 at 4. However, he concluded that the decline "was directly related to a decline in tributary inflow from plains drainage areas, combined with below-average flows at Las Animas." *Id.* at 5, 9, 12, 19. He refused to permit a compact administration investigation of well development in Colorado "when the single and double-mass diagrams do not suggest that well development in Colorado has had an impact on usable stateline flows." *Id.* at 23. McDonald did not agree with the conclusions in Kansas' report on well pumping. Jt. Exh. 31 at 33-34. Kansas argues that neither state was actually aware that well pumping was causing material depletions of usable flow at the Stateline until the compact administration investigation in 1985. RT Vol. 142 at 128-29.

Colorado also relies upon the depositions of three Kansas officials to demonstrate that Kansas was on notice of the well development in Colorado. These officials were Carl Bentrup, a Kansas representative to the compact administration for more than thirty years; Guy Gibson, employed by the Kansas Division of Water Resources for forty-three years and serving as chief engineer for eleven

years before his retirement in 1983; and Howard Corrigan, the former Kansas water commissioner of the Garden City field office. Their depositions, which were introduced into evidence, show that these men were aware of some well development in Colorado, and that some informal discussions occurred within the compact administration. However, the evidence is sketchy and does not demonstrate that these officials were aware of the number of wells, the extent of Colorado's pumping, or the impact or even potential impact of pumping on usable Stateline flows. Colorado frequently refers to "well development," but that alone does not violate the compact.

D. Application of an Equitable Statute of Limitations.

During argument on my Draft Report, Colorado presented a "slightly different twist" to the application of laches. RT Vol. 142 at 100. Colorado argued that Kansas had not complained about pumping until 1984 or 1985; that in the early postcompact years, Colorado was not aware there was a problem, and had acted in good faith; and that it is fundamentally unfair under those circumstances to permit Kansas to reach back to 1950 for its damages, either in water or in money. RT Vol. 142 at 110-11, 117, 149. Colorado urges that I "strongly consider imposing an equitable statute of limitations,[58] so that we

[58] Colorado was not aware of any applicable federal statute of limitations, nor am I. RT Vol. 142 at 118.

are not in a position of paying for sins that weren't sins." RT Vol. 142 at 118.

Colorado also accuses Kansas of sleeping on its rights, saying that is the issue. RT Vol. 143 at 52; RT Vol. 142 at 110. This latter argument, however, seems to undercut Colorado's reliance on its own good faith. At least, Colorado's argument requires that Kansas recognize a potential compact violation while Colorado is excused.

In any event, Kansas relies upon *Texas v. New Mexico*, 482 U.S. 124, 96 L.Ed. 2d 105, 107 S.Ct. 2279 (1987) for the proposition that acting in good faith does not excuse a compact violation. There, the Court stated at page 129:

> "But good-faith differences about the scope of contractual undertakings do not relieve either party from performance. A court should provide a remedy if the parties intended to make a contract and the contract's terms provide a sufficiently certain basis for determining both that a breach has in fact occurred and the nature of the remedy called for. Restatement (Second) of Contracts § 33(2), and Comment b (1981). There is often a retroactive impact when courts resolve contract disputes about the scope of a promisor's undertaking; parties must perform today or pay damages for what a court decides they promised to do yesterday and did not. In our view, New Mexico cannot escape liability for what has been adjudicated to be past failures to perform its duties under the Compact."

In *Texas v. New Mexico* the Court upheld a total shortfall of 340,100 acre-feet that had accumulated over the period 1950-83, and permitted money or water damages

for that amount. 482 U.S. at 127-28. Under a compact signed in 1948, New Mexico was barred from depleting the flow of the Pecos River at the New Mexico-Texas border below that which was available to Texas under 1947 conditions. An engineering advisory committee drafted an Inflow-Outflow Manual to determine how much water Texas should expect to receive over any particular period for any particular levels of precipitation, under the consumption conditions prevailing in New Mexico in 1947. However, it became clear "soon after the Compact went into effect" that the Inflow-Outflow Manual did not describe the actual state of the river. *Texas v. New Mexico*, 462 U.S. 554, 560, 77 L.Ed. 2d 1, 103 S.Ct. 2558 (1983). In almost every year following adoption of the Compact, flows at the state line were significantly less than the levels predicted by the Manual, with no obvious changes in either natural conditions or uses in New Mexico.[59] As a result, the basic meaning of the 1947 condition was not defined until 1979, and a workable methodology for translating New Mexico's obligation into quantities of water was not achieved until 1984, in the course of the litigation between the states. The Master reported in 1982 that New Mexico's obligation "is still uncertain," and that New Mexico "had acted in good faith." *Texas v. New Mexico*, 482 U.S. 124, 129, 96 L.Ed. 2d 105, 107 S.Ct. 2279 (1987). Nonetheless, when the obligation was finally determined, the shortfall was assessed back to 1950.

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[59] The Inflow-Outflow Manual proved to be so faulty as to be unusable.

Colorado attempts to distinguish these Pecos River decisions, arguing that between Texas and New Mexico there had been "an ongoing and consistent pattern of ignored complaint." RT Vol. 142 at 110. This appears to be somewhat of an overstatement. For the first 15 years the Pecos River Commission[60] functioned in "apparent harmony," albeit under a tacit agreement to defer the problem of determining the required flows at the state line. *Texas v. New Mexico*, 462 U.S. 554, 560, 77 L.Ed.2d 1, 103 S.Ct. 2558 (1983). The dispute surfaced sometime after 1962 and came to a head in 1970. *Id.* at 561. Texas invoked the original jurisdiction of the Supreme Court in 1974. *Id.* at 562. While there is no indication that laches was raised in the *Texas v. New Mexico* litigation,[61] the Court's decisions there seem to militate against Colorado's theory of an equitable statute of limitations.

In the final analysis, however, statutes of limitation are not a truly appropriate analogy to the argument Colorado now makes. Such statutes are characterized by the specificity of their terms and the rigidity with which they tend to be applied. Laches, on the other hand, can be as flexible as the circumstances of each particular case require. Although, as already noted, various rules are ordinarily followed in applying laches, it is after all simply a tool of equity in the task of reaching a fair decision.

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[60] Comparable to the Arkansas River Compact Administration.

[61] New Mexico argued that this Court could require only the future performance of compact obligations, without any remedy for past breaches. 482 U.S. at 128.

This flexibility is especially present in the original jurisdiction, which follows chancery jurisprudence only as an analogy and which looks ultimately to fundamental principles of justice. *Florida v. Georgia, supra*, 58 U.S. (17 How.) 478, 492, 15 L.Ed. 181, 189 (1855).

Thus, the decision to accept or reject Colorado's request to exclude the early years of excess pumping lies within the sound discretion of the Court. If the Court is inclined to approve any such exclusion, my recommendation is that it should not cover the full 25 years urged by Colorado, but at most should apply only to damages from pumping that occurred before 1965. By 1965, the Colorado legislature was fully alerted to the potential impact of wells on surface flows throughout the state, and acted to require the state engineer to administer underground waters tributary to surface flows in accordance with the priority system. Colo. Exh. 378, C.R.S. § 148-11-22. After that time, the "good faith" underpinning of the Colorado position begins to erode.

Apart from Colorado's present arguments, and apart from any prospective relief, equitable considerations may still be appropriate during the remedy phase of the trial. If the Court upholds my recommendation on liability caused by postcompact pumping, it will be necessary to determine the amount of depletions of usable Stateline flow. The Court's decisions permit a remedy for past shortages either in water or money. With respect to ordering deliveries of water, the Court has stated:

> "To order making up the shortfalls by delivering more water has all the earmarks of specific performance, an equitable remedy that requires

> some attention to the relative benefits and burdens that the parties may enjoy or suffer as compared with a legal remedy in damages. '[S]pecific performance is never demandable as a matter of absolute right, but as one which rests entirely in judicial discretion, to be exercised, it is true, according to the settled principles of equity, but not arbitrarily and capriciously, and always with reference to the facts of the particular case.' Haffner v. Dobrinski, 215 US 446, 450, 54 L Ed 277, 30 S Ct 172 (1910). Specific performance will not be compelled 'if under all the circumstances it would be inequitable to do so.' Wesley v. Eells, 177 US 370, 376, 44 L Ed 810, 20 S Ct 661 (1900)." *Texas v. New Mexico*, 482 US 124, 131, 96 L.Ed. 2d 105, 107 S.Ct. 2279 (1987).

E. Conclusions.

The extent of postcompact well pumping in Colorado was not generally known until approximately 1968, and there is no substantial evidence that Kansas knew or should have known about the effect of such well development before that time. By then, almost all of the wells of which Kansas now complains had been constructed. By the 1970s the extent of pumping in Colorado was a matter of common knowledge, but that is not to say that the impact of such pumping on usable Stateline flows was generally known or understood. Indeed, it appears not to have been, even in Colorado. I do not believe that Colorado officials thought they were sanctioning a compact violation in the well regulations that were established, or in their failure to adopt specific regulations to protect usable Stateline flows, or in the issuance of new well permits.

There is no specific evidence to explain why Kansas did not complain sooner, but Kansas may well have been relying upon the slowly developing regulatory system in Colorado for protection. This program was evolving all through the 1970s, including the promising concept that augmentation of supplies would be required in order to allow pumping. It is true that the implementation of this requirement has proved lacking, but that result could not have been known at the outset. I think that Kansas had a right to rely, at least initially, upon the Colorado efforts to regulate pumping, and the law should not penalize a state under those circumstances. The compact itself states that, except as otherwise provided, nothing shall supplant Colorado's administration of its water supplies. Article VI-A(2). Moreover, equitable defenses should not be applied in ways to encourage or force early litigation between states, particularly when a state is implementing efforts to address the problem.

I conclude, therefore, that Kansas has not been guilty of inexcusable delay in making its well claim, and that Colorado has not been prejudiced by Kansas' failure to press its claim earlier. Kansas should not be barred by laches or any other equitable defense, including acquiescence, from obtaining relief based on its well claim. In reaching these conclusions, I have fully considered the Court's statement in *Colorado v. Kansas*, 320 U.S. 383 at 394, that unjustified delay must "gravely add" to the plaintiff's burden and be weighed in considering the equities of the case.

(14)

No. 105, ORIGINAL

In The

Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

and

UNITED STATES OF AMERICA,

Defendant-Intervenor.

ARTHUR L. LITTLEWORTH, Special Master

REPORT

VOLUME II

July 1994

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SECTION XIV

THE 1980 OPERATING PLAN

Colorado has acknowledged that wells drilled east of the Buffalo Canal headgate after 1965 depleted Stateline flows. For example, in its Closing Brief re Kansas' Well Claim Colorado states:

> "Colorado does not dispute that wells drilled east of the Buffalo Canal headgate after 1965 depleted Stateline flows to some extent during the 1970s." At 19; see also RT Vol. 114 at 116; RT Vol. 77 at 23-26; RT Vol. 66 at 47.

However, Colorado maintains that Kansas received substantial benefits from the 1980 Operating Plan; that these benefits have offset the impact of the wells drilled downstream from the Buffalo Canal after 1965; and that adoption of the plan by the authorized representatives of the two states "should bar any claim by Kansas for breach of compact after 1980." Colo. Closing Well Br. at 49-50; RT Vol. 81 at 156; RT Vol. 115 at 67-68; RT Vol. 133 at 70-74. In a later brief, Colorado said that acceptance of the 1980 plan "should bar any claim against Colorado related to postcompact well development in Colorado or the WWSP since 1980." Colo. Response Br. at 27. A more limited contention was presented during oral argument on the Draft Report.

Kansas responds that there are a number of reasons why the Colorado arguments should fail, "but one of these is fully sufficient." Kan. Answer Br. at 13. Kansas refers to Section VI of the 1980 Operating Plan which reads:

> "Adoption of this resolution [approving the 1980 Operating Plan] does not prejudice the ability of Kansas or of any Colorado ditch to object or to otherwise represent its interest in present or future cases or controversies before the Administration or in a court of competent jurisdiction." Jt. Exh. 21, Doc. 11.

While acknowledging the benefits of the 1980 plan, and while allowing the plan to continue in operation, Kansas nonetheless has taken the position from the outset of the case that the plan constitutes an administrative rewriting of Article V of the compact, and thus "is *ultra vires* and legally void *ab initio*." Kan. Pretrial Statement at 165-66. The same position is maintained in Kansas' Reply Brief at 17, 22. It may be that Kansas is merely wary of the 1980 plan being used to establish an accord and satisfaction, which indeed is an affirmative defense alleged by Colorado – although it is difficult to conceive of an agreement subject to a one-year termination clause as an accord and satisfaction. Put another way, this may be a defense reserved by Kansas if Section VI of the plan should prove not to be sufficient, and if the Court were otherwise to bar relief based upon the benefits of the plan.

In any event, during the trial Kansas did not seek to have the plan invalidated; no such claim is included in the pleadings; and Colorado states that it is unnecessary to resolve the issue of the plan's legality in this case. Colo. Closing Well Br. at 57. I agree. The plan clearly represents a more efficient method of operation of John Martin Reservoir, and is beneficial to both states. There is no reason or need here to consider invalidating it.

A. Operation Under the 1980 Operating Plan.

The 1980 Operating Plan has been briefly discussed earlier in Section V of this Report. Duane D. Helton, a primary expert witness for Colorado, was one of the persons mainly responsible for drafting the plan. Colo. Exh. 17 at 81, 86-87. During the 1970s, Helton was an engineering assistant to the Director of the Colorado Water Conservation Board, the official state member on the compact administration. During many of the administration meetings, Helton represented the Colorado Board. He was also chairman of the special engineering committee that evaluated various water use proposals that came before the compact administration, including the winter water program in Pueblo Reservoir. RT Vol. 115 at 64. Involved in the plan negotiations for Kansas were Howard Corrigan, Carl Bentrup, Guy Gibson, and Fred Stoeckley. RT Vol. 81 at 141. Bentrup testified during his deposition that the 1980 Operating Plan was "the most constructive thing" done while he was a member of the compact administration. Colo. Exh. 17 at 91-92. John Martin Reservoir is still operated pursuant to the plan, as slightly revised in 1984. Jt. Exh. 21, Doc. 29.

Briefly, the 1980 plan divides the water conserved in John Martin Reservoir into separate, individual accounts. Kansas is allocated 40% of the conservation storage, with the remaining 60% being divided in specified percentages among the nine canal companies in Colorado Water District 67. Section II-D(2),(3). Kansas and the various Colorado ditches may demand the release of water contained in their respective accounts at any time, and at whatever

rates they desire. Helton testified that a storage account system had been talked about for years as a way to achieve "greater efficiency" and beneficial use. RT Vol. 81 at 129-130.

The plan also gives three Colorado canal companies, namely, Amity Mutual Irrigation Company, Fort Lyon Canal, and Las Animas Consolidated Canal Company, additional storage rights in John Martin Reservoir. Amity is permitted to store water which it otherwise could divert from the Arkansas River and store in the Great Plains Reservoir System. The other two canal companies may store water approved under the Pueblo winter storage plan, subject to a 20,000 acre-feet limit for Fort Lyon, and a 5,000 acre-feet limit for Las Animas. Of the water thus stored by these three Colorado canal companies 35% now goes into a Kansas transit loss account. Releases of stored water from the Kansas account are measured at the Stateline, and transit losses between John Martin Reservoir and the Stateline are made up from this Kansas transit loss account. Section III-D, Section II-E(4).

Under the 1980 plan, all winter flows are stored in John Martin Reservoir, and Colorado gives up its right to demand releases of 100 cfs during the winter season. Kansas also waives its compact right to divert summer river flows between 500 and 750 cfs. Summer inflow goes to the Colorado users in District 67 unless such flow exceeds their existing irrigation requirements by at least 1000 acre-feet. Under those circumstances, summer flow goes into conservation storage to be allocated among the various accounts.

B. Benefits Under the 1980 Operating Plan.

Evidence was introduced during the trial in an effort to quantify the benefits to Kansas under the plan, and to compare such amounts with estimated depletions. In the post-trial briefs, there is also considerable argument about which state benefitted more from the changed method of operating John Martin Reservoir. But I do not believe that such evidence and argument are useful, considering the way in which I have analyzed the issues raised by Colorado. The fact is that both states received significant benefits, and both states yielded certain rights otherwise available under the compact. RT Vol. 81 at 155-56; RT Vol. 66 at 54-55.

For Kansas, the 1980 plan guaranteed that it would receive 40% of the water stored in the conservation pool, and it allowed Kansas to call for water more nearly in accord with its crop demands. Under the common pool concept provided in the compact, to receive its fully allowable share, Kansas had to call for water whenever Colorado did, whether or not Kansas farmers then needed the water. There is evidence that in the early years Kansas did not always do so, and thus received less than 40%.

The 35% charge on water stored in John Martin by the three Colorado canal companies and the use of this water to establish a transit loss account also solved a long-standing and troublesome problem. Kansas' share of the river has always been determined at John Martin Reservoir, but measured in equivalent flow at the Stateline some 58 miles downstream. Transit losses have long

been a problem. Colo. Exh. 21 at 133, 136-37; Colo. Exh. 17 at 55-59, 82. As a result of all of these changes, Colorado maintains that Kansas has received a larger percentage of water from John Martin Reservoir, and an increase in usable flows at the Stateline. Colo. Reply Br. at 5.

For Colorado, storage of water in their offstream reservoirs was most inefficient. A USGS paper indicates that only about half of the water diverted into storage entered the distribution system. Colo. Exh. 94 at 1. Helton described the Great Plains Reservoir System as "very inefficient." RT Vol. 81 at 125. By allowing Amity to store its Great Plains water in John Martin Reservoir, Bentrup testified that Amity "stood to gain a substantial windfall." Colo. Exh. 17 at 83. In fact, however, the savings were shared approximately equally with Kansas. Although the charge of 35% on stored water was a negotiated figure, the basis for that percentage lay in sharing the water gained by storing water in John Martin instead of in the Great Plains System. RT Vol. 81 at 136-37. In addition, each of the nine canal companies received its own separate account and no longer had to compete for released water, being able to call for it when most needed. Colorado users also received 24/35 (69%) of any excess waters left each year in the Kansas transit loss account. Fort Lyon and Las Animas were also permitted to store water from the Winter Water Storage Program in John Martin.

It is undisputed that the 1980 plan was beneficial to the water users in both states. Helton so testified, as did other witnesses. RT Vol. 81 at 155-56; RT Vol. 33 at 50-51, 104; Colo. Exh. 17 at 91-92. The 1980 plan was negotiated and evolved through several test years beginning in 1976

when Amity was first permitted to store in John Martin Reservoir. Jt. Exh. 21, Docs. 3, 4, 5, 7, 8, 9, 11. The negotiations were thorough, between parties of equal stature, with give and take by both states, and with several different approaches being taken during the test years.

C. Intent of the 1980 Operating Plan.

I do not find support for the Colorado argument that the benefits to Kansas under the 1980 plan should offset Stateline depletions caused by well pumping in Colorado. The plan itself indicates that it was intended to improve the efficiency of the operation of John Martin Reservoir. The recitals state that the then present operation of the conservation features of the reservoir did not result "in the most efficient utilization possible of the water under its control"; and the recitals include an administration finding that the plan may "result in more efficient utilization of water." There is nothing in the plan itself to indicate that it was intended to be used as an offset against compact violations, or as a solution to the impact of well pumping in Colorado.

I have also reviewed the record, specifically the numerous documents included in Joint Exhibit 21 that led to the development of the 1980 plan. These negotiations and various interim arrangements began in 1976, but there is nothing in the evidence that reflects the fact that the plan was intended to offset the impact of well pumping, or was a settlement of Kansas' well claims.

In its Closing Brief re Kansas' Well Claim, Colorado maintains that the 1980 plan was a practical solution devised "to address changes in the regime of the Arkansas River brought about by well development in both States." Page 19. In its Reply Brief at page 5, Colorado reiterates that the 1980 plan was a "fair and equitable solution to the problems caused by increased well development in both States." *Id.* at 22. However, Colorado provides no evidentiary citations to support these statements, nor do I find that this was the intent of the plan.

Kansas argues that the Colorado position would override Article IV-D of the compact, essentially allowing an administrative modification of the compact without the required consent of Congress. Colorado responds that the 1980 Operating Plan comes well within the authority of the Arkansas River Compact Administration under the compact; that Colorado does not contend that the compact can be lawfully altered without the consent of Congress; and that the issue is only whether Kansas' conduct may be considered in the attempted enforcement of an equitable right or remedy. However, these arguments go beyond what needs to be decided here since I do not believe there was any intent that accepting benefits under the 1980 plan would preclude any future well claim under the compact.

Colorado also states that both states realized that "the only feasible method to develop the unused waters of the Arkansas River below John Martin Dam was through additional well development." Colo. Closing Well Br. at 22. Colorado cites testimony by Helton to support this argument, but I believe its brief overstates

his testimony. Helton expressed only his own belief, not what "both States realized," adding, however, "that is what both States did," namely, to allow well development. RT Vol. 86 at 78-79; RT Vol. 115 at 64.

During oral argument on my Draft Report, Colorado presented a more limited argument with regard to the 1980 Operating Plan. No longer did it assert that approval of the Plan should bar *any* claim for well depletions after 1980, but rather that it "should mitigate damages to Kansas for the period after 1980." RT Vol. 143 at 41-43. In support of this position, Colorado placed heavy emphasis on the deposition of Carl Bentrup, a longtime Kansas representative to the Arkansas River Compact Administration. It is asserted that Bentrup believed that transit losses of water released from John Martin Reservoir were due at least in part to well pumping, and that his testimony "clearly establishes that the 1980 Operating Plan was intended to mitigate the impact of well pumping in Colorado." Colo. Oral Argument Memorandum at 46, 48.

There is no doubt that in the dry years of 1977 and 1978 transit losses between John Martin and the Stateline were a concern, but the evidence indicates that the problem lay primarily with surface diversions by the Colorado ditches, not with wells. Kansas' compact entitlement from John Martin Reservoir is to be "satisfied by an equivalent in Stateline flow." Article V-E(3). In Bentrup's view, if Kansas' water was not reaching the Stateline, the only way to rectify the situation was to "curtail Colorado ditches." Colo. Exh. 17 at 59. Indeed, Colorado's compliance efforts were directed at such surface diversions, not at well pumping.

In 1977 the ditch companies below John Martin by mutual agreement stored winter water in the reservoir, and voluntarily allowed conservation pool releases in the spring to run past their respective headgates for the first 24 hours. Kan. Exh. 462. In 1978 the Colorado Water Commissioner of Water District 67 issued an order to the same effect, but Amity Mutual then refused to comply. With the support of the compact administration, the Colorado State Engineer sought an injunction against Amity, but the water court dismissed his complaint. *Id*. The water court concluded that acting against only the ditch companies within District 67 was discriminatory; moreover, that prior action by the compact administration was required. Without ruling on these issues, the judgment of dismissal was affirmed on appeal. *People ex rel Danielson v. Amity Mutual Irrigation Co.*, 668 P.2d 1368 (Colo. 1983).

The 1980 Operating Plan was intended, in part, to deal with these transit loss problems, but the evidence does not support the view that it was also intended to mitigate compact violations from well pumping. Nor was any such claim made by Colorado when Kansas formally complained to the Arkansas River Compact Administration in 1985 about well pumping in Colorado.

D. Conclusions.

The 1980 Operating Plan provided benefits to both Kansas and Colorado which were separately bargained for. There is no evidence to support the claim that the benefits to Kansas were in settlement of its well claims. Colorado received ample consideration under the agreement for the 1980 plan without a waiver of Kansas' well

claims. The benefits received by Kansas under the plan should not be offset against compact violations, and should not be a bar to any of the Kansas claims in this case.

Colorado also states that Kansas should be barred from claiming that it is entitled to an accounting based upon demands for releases from John Martin Reservoir which are different from those called for under the plan. Colo. Closing Well Br. at 57. Once conservation storage has been released to Kansas in accordance with the plan, Colorado states that the remedy available to Kansas is limited to terminating the plan. Colo. Response Br. at 25-26. I am not aware that Kansas takes a contrary view of either of these statements. So long as the 1980 plan is not terminated or determined to be invalid, it is controlling on the releases from John Martin Reservoir.

SECTION XV

PRECOMPACT PUMPING ALLOWANCE

Both Kansas and Colorado acknowledge that some wells were in existence during the precompact years, and that pumping of groundwater did occur. Both states also agree that a certain amount of pumping should thus be allowable under the compact. However, the states are in major disagreement over the extent of this allowance. In fact, in terms of potential impact on Stateline flows, the amount of so-called "precompact" pumping is the largest quantitative issue in the case.

Kansas estimated that groundwater pumping in 1948 between Pueblo and the Stateline amounted to approximately 11,000 acre-feet. Kansas considers this to be the amount of pumping thus "grandfathered" under the compact and allowable in postcompact years. Over the 1950-85 period, Kansas estimated that total pumping by Colorado users amounted to 5,810,000 acre-feet. Kan. Exh. 731. Of this total, Kansas considered that 396,000 acre-feet (i.e., 11,000 acre-feet per year) represented allowable pumping under the compact. *Id*. Thus, in attempting to estimate impacts on Stateline flows resulting from postcompact pumping, the Kansas H-I model used the difference, namely 5,414,000 acre-feet over the 1950-85 period, as the measure of the alleged wrongful pumping. *Id*.

In contrast, Colorado estimated pumping for each of the years from 1940 through 1949 with annual amounts that varied from a high of 36,837 acre-feet to a low of 14,891 acre-feet. Colo. Exh. 165*, Table 9.8. However, in

determining allowable pumping under the compact, Colorado did not use the amount of water actually produced, but rather relied upon the claimed right of precompact wells to pump. Colorado determined which wells had precompact dates of appropriation, and for each postcompact year Colorado calculated allowable pumping by using a ratio based upon the decreed acreage of the precompact wells divided by the decreed acreage of all wells for each given year. Colo. Closing Well Br. at 63. Using this methodology, Colorado's calculation of allowable pumping by precompact wells averaged 49,275 acre-feet per year over the 1950-85 period, or a total of 1,774,000 acre-feet. Colo. Exh. 692 b*; Kan. Exh. 731. Colorado estimated total pumping by all wells for the 1950-85 period at 5,227,000 acre-feet. Subtracting the claimed allowance for precompact wells, the amount of pumping which Colorado used to determine Stateline impacts was 3,453,000 acre-feet for the 1950-85 period. *Id*. This would compare with the Kansas figure of 5,414,000 acre-feet.

At stake, therefore, is whether or not 1,378,000 acre-feet of postcompact pumping or some portion thereof will be considered as allowable under the compact. This amount is the difference between Kansas' allowance for precompact pumping of 396,000 acre-feet and Colorado's claim of 1,774,000 acre-feet for precompact wells. *Id*. Colorado's expert witness Dewayne Schroeder called this the major reason for the different estimates of Stateline depletions. RT Vol. 139 at 109.

A. Estimated Amounts of Actual Precompact Pumping.

Kansas estimated that more than 800 wells were in existence in 1948. One of its exhibits shows 849 wells, while its post-trial brief puts the number at approximately 880. Kan. Exh. 30, Table 2; Kan. Opening Br. at 11. The Colorado estimate for 1949 is 717 wells. Colo. Exh. 165*, Table A.1. Although Dr. Danielson testified that "numerous wells" existed in precompact times, he said they "weren't relied upon generally," and that reliance on wells was "not substantial." RT Vol. 76 at 35. This situation did not change until the "severe" drought in the 1950s and the corresponding development of the high capacity turbine pump and the availability of cheap energy. *Id*; Jt. Exh. 157 at 8.

By today's standards, the wells of 1940-48 appear fairly primitive. Dr. Danielson described them:

> "The Witness: Generally speaking, your Honor – and we have Mr. Longenbaugh who is a pump expert – but my experience is they were centrifugal pumps operated usually with electric motors, but oftentimes with a tractor backed up with a 90 degree gear head on it or something or large pits dug with the pump set down close enough to the water table that they could get a decent suction and then operated sometimes with a prime mover up on top or a power line up on top and huge belts running down into the pit. Generally speaking, centrifugal pumps of some sort. That isn't to say that there weren't any turbine pumps. I think there probably were, but the pumping was primarily by centrifugal lift pumps.

> Special Master: So the turbine pumps were developed primarily in the late 40's, early '50's?
>
> The Witness: At least that is where the major application began. The technology, I'm sure, was there prior, but the application would be really in that dry period in the '50's when the big surge in well development came." RT. Vol. 76 at 102.[62]

According to Danielson, these old centrifugals were generally replaced with the more efficient turbine pumps. RT Vol. 76 at 105.

Prior to the trial of this case, pumping for 1940-49 had been estimated in five separate hydrologic reports. None of these reports, however, estimated amounts that approached the yearly average of 25,228 acre-feet submitted by Colorado for use in the trial. Calculated from Colo. Exh. 165*, Table 9.8. The first of these earlier studies was the 1968 Wheeler Report prepared pursuant to Colorado legislation. The yearly average in that report was 10,600 acre-feet, ranging from 2300 in 1940 to 23,000 in 1949. Jt. Exh. 92 at 22. Then in 1970 the USGS issued the results of an intensive study that included similar figures, estimating 1940 at about 2000 acre-feet and increasing to 23,000 at the end of the decade. Jt. Exh. 66; Colo. Exh. 993.

In 1975 the Colorado state engineer's office published another report done under the supervision of Dr.

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[62] Helton also agreed that the older wells in existence in the 1930s and 1940s "were pretty inefficient, just big holes," and modern day wells didn't come into being until after World War II with the development of the turbine pump and cheap electricity. RT Vol. 82 at 136-37.

Danielson who was then the deputy state engineer. Jt. Exh. 94. This report was introduced into evidence on behalf of the state engineer during the trial of *Kuiper v. Atchison, Topeka & Santa Fe Ry. Co.*, and in support of his amended rules and regulations on pumping. (See Section XI(I) herein.) The report appears to have relied upon the USGS 1970 work, estimating the 1940-50 average at 12,600 acre-feet per year. Jt. Exh. 94 at 49. However, during this trial, Danielson testified that the annual pumpage figures in the report do not now seem to be reasonable, although he offered no corrections. RT Vol. 78 at 83-84.

In 1985 the USGS issued another report in which it repeated the pumping estimates published in its 1970 report. Jt. Exh. 129 at 10. Finally, in 1986, the United States Department of Agriculture in participation with the Colorado Water Conservation Board issued a report on the Arkansas River Basin which again included the early pumping estimates found in the 1970 USGS Report. Jt. Exh. 108 at I-11, A-15.

Determining the general level of precompact pumping is important if that is to be the measure of allowable pumping under the compact. It should be noted, however, that Colorado objects as a matter of law to the use of a single value for this purpose. Nonetheless, I find that 15,000 acre-feet per year is the most reasonable figure to represent pumping in precompact years. This is the highest amount estimated in each of the five reports for the years during which compact negotiations took place. Experts for both states also relied heavily on data from the 1970 USGS report (Basic-Data Release No. 21) in which this 15,000 acre-feet estimate appears. Moreover, Colorado called one of the authors of the Report as a

witness and he staunchly defended the accuracy of the USGS's pumping estimates. RT Vol. 129 at 61-62, 64. This was Thomas J. Major, a USGS employee from 1959 to 1985.

The Colorado Supreme Court stated that in 1940 only 2000 acre-feet were being pumped from wells in the Arkansas Valley. *Fellhauer v. People*, 167 Colo. 320, 447 P.2d 986 at 991 (1968). This 2000 acre-feet amount is in contrast to the figure of 36,837 calculated by Colorado for this trial. Colorado also used the USGS data (Basic-Data Release No. 21) in its 1975 report prepared for proceedings before the Water Court, and introduced into evidence. RT Vol. 76 at 88, 94; RT Vol. 77 at 35-36; Kan. Exh. 514 Vol. 1 at 5, 49-53, 145-52, 211-14. And from the Kansas viewpoint, its expert testified that while he thought 15,000 acre-feet was high, it was nonetheless reasonable. RT Vol. 125 at 60-61, 69.

Counsel for Colorado in his cross-examination of Kansas expert Dale E. Book did expose some inconsistencies in Joint Exhibit 94 which includes the 1940-49 pumping estimates published by the USGS in Basic-Data Release No. 21. The cross-examination concerned Table 7 in Joint Exhibit 94 which was prepared by the Colorado state engineer's office. It purports to show not only the total amount of water pumped for each year from 1940 through 1972, but also the amount of electric power associated with the pumping for each such year. The table states that the power data is taken from USGS Basic Data Release No. 21. However, those data do not appear in the USGS report, and no one seemed to know where they came from. RT Vol. 126 at 58; RT Vol. 130 at 49. Book agreed, however, that the relationship between the power

data and water consumption did not appear to be reasonable for some years. RT Vol. 126 at 58. Hal Simpson, the Colorado state engineer, was of the same opinion. RT Vol. 130 at 51. In comparing certain years, power consumption decreased while pumping increased.

However, the evidence is without dispute that the published power records for this early period were incomplete, and it may well be that it is the power data on Table 7 not the pumping estimates that are inaccurate. Virtually nothing is known about these power figures, but the pumpage estimates have been accepted, published and used by the State of Colorado, the courts, the U.S. Department of Agriculture, and the USGS, and in the case of USGS as late as 1985. Moreover, there is persuasive testimony by one of the authors of the Basic-Data Release No. 21 (where the pumping estimates but not the power consumption figures appear) as to the accuracy of that USGS publication.

As an alternate to this 15,000 acre-feet figure, Kansas estimated 1948 pumping to be approximately 11,000 acre-feet. Colorado argues that this figure is both unreasonable factually and wrong as a matter of law. Colo. Closing Well Br. at 60, 66. The year 1948 was wet, and I believe that Kansas' use of this single year is subject to the legitimate criticism that diversions were likely to have been high and pumping low. RT Vol. 82 at 133, 139; RT Vol. 84 at 17; RT Vol. 111 at 118, 120. The 15,000 acre-feet figure more likely reflects the general amount of Colorado's pumping that was affecting the flows of the Arkansas River at the time of the compact negotiations.

Colorado also developed pumping estimates for the 1940-49 period for use in this trial. Its annual average was 25,228 acre-feet, but I have some concern about these higher numbers. During oral argument on my Draft Report, Colorado sought an even larger amount, on the order of 36,000 acre-feet annually. Both states relied upon power consumption records as the basis for calculating pumping. However, because the early data were incomplete, Book testified that something over half of Colorado's estimated power usage during the precompact years came not from actual data but through regression analyses. RT Vol. 125 at 57. For 1940-45 these analyses depended upon a single data point taken from the Pueblo office of CENTEL, and the amounts of Las Animas energy were correlated to SECPA values which themselves had been estimated. RT Vol. 71 at 56-60, 91. Colorado's pumping figures also included adjustments for pumping by nonelectric wells, and for pump efficiencies.

In making these adjustments, Colorado extrapolated backward in time from the 1964-68 well data collected by the USGS and published in Basic-Data Release No. 21. RT Vol. 125 at 49. As a result, Colorado assumed that nonelectric pumping increased going back in time as a percentage of total pumping. RT Vol. 126 at 56. Moreover, its analysis assumed that the older pumps in the 1940s were more efficient, and hence pumped larger quantities of water for any given amount of power consumption. RT Vol. 72 at 6-7; RT Vol. 125 at 58; RT Vol. 126 at 36-37, 43. However, it appears that the Colorado analysis did not take into account the replacement of centrifugal pumps with the more efficient turbine pumps that occurred in the late 1940s and early 1950s.

For whatever reason, the result of the Colorado approach is to make pumping in 1940 the highest amount in the whole decade of the 1940s.[63] This result seems questionable in light of all the earlier studies showing increasing pumping throughout the 1940s, and the new wells which continued to be drilled throughout the decade. Colorado's own report puts the number of additional wells drilled between 1941 and 1949 at 122. Jt. Exh. 94 at 19. A lower rather than higher estimate of early 1940s pumping is also supported by the fact that during the compact negotiations the engineering committee made no effort to include pumping as part of the diversion data, or indeed at all. Jt. Exh. 5 at 3. The historic division of flow between the two states was considered on the basis of surface diversions alone.

B. Colorado's Theory of the Entitlement of Precompact Wells.

While Colorado did introduce protective evidence on the amounts of precompact pumping, Colorado rejects the idea of using any single value to represent the amount of pumping that is allowable under the compact. Instead, Colorado argues that postcompact pumping by precompact wells will vary from year to year depending upon the crops grown, hydrologic conditions, and the amount of surface water available. Colo. Closing Well Br. at 62. Precompact wells, according to Colorado, should be allowed to pump in the later years the amount of water

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[63] It is generally acknowledged that 1940 was a very dry year. Jt. Exh. 5, Tables 1-7; RT Vol. 126 at 67.

needed to supply "unmet demand" and permitted under Colorado law. RT Vol. 114 at 30, 32. Such unmet demand was based on sufficient water for optimum crop production. RT Vol. 70 at 40. In order to quantify such amounts, Mr. Helton testified to a "decreed acreage" approach which was based upon his understanding of the entitlement of these wells under Colorado law. Colo. Reply Br. at 31.

Colorado first identified the wells with precompact dates of appropriation. These were considered to be wells that existed on May 31, 1949. RT Vol. 84 at 20. It should be noted that such appropriation dates were not decreed until sometime after 1969. It was not until the 1969 legislation in Colorado that all wells were required to be registered, and a procedure was established to determine retroactively the appropriation dates based upon the dates when the wells began to pump, and also to determine the acreage irrigated.[64] The precompact amount of decreed acreage in the Colorado analysis is thus a fixed figure. RT Vol. 82 at 139. It is 43,724 acres. RT Vol. 83 at 7.

In each year in the 1950-85 period, Helton testified that Colorado's experts then determined the total amount of pumping, and the total amount of decreed acreage associated with such pumping. Next, Colorado calculated a ratio for each year based on the decreed acreage of the

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[64] These were largely uncontested proceedings, and Colorado acknowledges that not all of the data may have been accurate. Colo. Response Br. at 72. However, it is not necessary to consider this issue further since I conclude that Colorado's reliance on these decrees to establish the amount of pumping allowed under the compact was not proper as a matter of law.

precompact wells divided by the total decreed acreage of all wells, and applied that fraction to the total amount of pumping for the year. RT Vol. 82 at 139; RT Vol. 84 at 14-16. In Helton's opinion this decreed acreage approach was the best way to estimate the volume of water pumped that was associated with precompact wells. RT Vol. 84 at 16. While the amount of such pumping varied year by year, the annual average for 1950-85 was 49,275 acre-feet. RT Vol. 82 at 136; RT Vol. 133 at 54; Colo. Exh. 135* at 1.1. This compares with average postcompact pumping by all wells of 145,199 acre-feet per year, as estimated by Colorado. Since 1976, the total decreed acreage for such wells has been in the order of 171,000 acres. Colo. Exh. 165*, Table A.1. In analyzing the impact of postcompact pumping on Stateline flows, Colorado then used the difference between these pumping amounts (49,275 and 145,199 on average), namely, an average of 95,925 acre-feet per year. Colo. Exh. 135* at 1.1. Of course, the impact was actually determined on an annual basis, and those amounts were then totalled.

Colorado's legal rationale for this approach is based first on Article VI-A(2) of the compact. It reads:

> "(2) Except as otherwise provided, nothing in this Compact shall be construed as supplanting the administration by Colorado of the rights of appropriators of waters of the Arkansas River in said State as decreed to said appropriators by the courts of Colorado, nor as interfering with the distribution among said appropriators by Colorado, nor as curtailing the diversion and use for irrigation and other beneficial purposes in Colorado of the waters of the Arkansas River."

Moreover, Colorado argues:

> "Article IV-D of the Arkansas River Compact imposed limits on future development and construction in both States, but not on existing development. The Kansas Commissioners who negotiated the Compact undoubtedly understood that pumping by wells in Colorado with precompact dates of appropriation would vary from year to year for the same reasons that diversions by surface ditches vary from year to year. They also undoubtedly understood that wells which were drilled before the Compact was approved, but became fully operational after the date of the adoption of the Compact would relate back to the date of the appropriation, because that had long been Colorado law." Colo. Response Br. at 71.

I believe there are several fallacies in Colorado's theory. I disagree with the Colorado argument that the rights of the precompact well appropriators, as decreed by the Colorado courts, are "binding on Kansas." Colo. Response Br. at 73. See *Hinderlider v. La Plata River & Cherry Creek Ditch Co.*, 304 U.S. 92, 102, 82 L.Ed. 1202, 58 S.Ct. 803 (1938); *Texas v. New Mexico*, 462 U.S. 554, 564, 77 L.Ed.2d 1, 103 S.Ct. 2558 (1983); *Frontier Ditch Co. v. Southeastern Colorado Water Conservancy District*, 761 P.2d 1117, 1123-24 (Colo. 1988). First, Article VI-A(2) does not render Kansas' Stateline entitlement subordinate to whatever appropriative rights may be decreed by Colorado courts. The Article begins with the phrase, "Except as otherwise provided," and must be read in conjunction with Article IV-D. I conclude that Article VI-A(2) was not

meant to override the obligations of Colorado under Article IV-D. The compact was intended, *inter alia*, to maintain in the future the general allocation of the natural river flows between the states that had existed in precompact years. Article IV-D was the primary means of accomplishing this result by preventing additional depletions. It applies not only to new construction but also precludes the "improved or prolonged functioning of existing works" if such development would cause a material depletion of usable Stateline flows. I find that new wells, the replacement of centrifugal with turbine pumps, and increased pumping from precompact wells all come within this provision. The compact negotiators did not intend to permit water use in either state to be increased at the expense of the other.

Second, it should be noted that the compact specifically provides that the ditch diversion rights within Colorado Water District 67 and in Kansas between the Stateline and Garden City shall not be "increased beyond the total present rights of said ditches" unless the compact administration finds that such increase would not result in a material depletion of usable flows. Article V-H. At the time the compact was negotiated, Colorado had no system for establishing the "rights" of wells. However, I cannot believe that the compact was intended to limit increased surface diversion rights, but to allow new rights to be later established for wells that would change the river allocation between the states.

Third, I disagree with Colorado about what the Kansas commissioners who negotiated the compact "undoubtedly understood." Indeed, I do not believe that

any of the commissioners, either from Colorado or Kansas, had in mind the development of the deep turbine pump or the possibility of such a dramatic increase in pumping. The controlling factor here is the language of the compact and the intent of the compact negotiators, a fact that Colorado acknowledges. Colo. Response Br. at 71, fn. 18. Pumping at the time was so insignificant that it did not even enter the discussions. But the relative allocation of water between the states, based on usage over recent times, did lie at the heart of the negotiations. The compact was intended to protect and maintain that general allocation – and to divide the new benefits of John Martin Reservoir storage. The Colorado legal theory and evidentiary approach would upset that allocation by some 1.7 million acre-feet over the 1950-85 period. I conclude that no such result was intended.

Following the issuance of my Draft Report, Colorado argued that if a single figure is to be used to represent precompact pumping, then the USGS estimate of 15,000 acre-feet is too low. Colorado asked that the amount of allowable precompact pumping be reconsidered. Colorado maintained: (1) that the 15,000 acre-feet amount was limited to pumping from the valley-fill aquifer only, and did not include pumping from the surficial aquifer; (2) that it also omitted irrigation wells with a capacity of less than 100 gpm; (3) and, finally, that climatic conditions during the precompact years were wetter than in later years, with the result that precompact pumping was less than normal. For this reason Colorado sought an upward pumping adjustment of 15 percent.

Colorado argued that including pumping from the surficial aquifer would increase the estimate by 5,180

acre-feet.[65] Adding wells under 100 gpm involved another 6.1 percent, according to Colorado, bringing the total to 21,400 acre-feet of pumping in 1948. Colo. Oral Argument Memorandum at 25. These adjustments alone would increase the total amount of "grandfathered" pumping by 238,000 acre-feet. However, in Colorado's view these figures were still low. Based on the calculations of its experts,[66] Colorado argued that the precompact pumping figure should be "at least 31,500 acre-feet." *Id.* at 26-27. When adjusted by 15 percent for climatic conditions, the full Colorado claim comes to just over 36,000 acre-feet. *Id.*

The first issue is whether the 15,000 acre-feet figure omitted pumping from the surficial aquifer. Counsel for Colorado stated that the "great bulk" of the surficial wells were located in the Bessemer service area, and it was "absolutely clear" that the area was excluded from the USGS 1964-68 study area. RT Vol. 143 at 17, 39. It does, indeed, appear that the intensive field work carried

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[65] This amount is based on 29.1 acre-feet per well for 178 wells, that is, the number of wells shown in the Colorado data base for 1948. Colo. Oral Argument Memorandum at 24. The 29.1 acre-feet number is the result of dividing 515 wells in the valley-fill aquifer into 15,000 acre-feet. Colorado's calculations assume that production from the surficial aquifer is at the same rate as from the valley-fill, although the evidence generally was to the contrary. See, e.g., Colo. Exh. 165*, Tables A.2, A.3.

[66] Colorado's experts estimated that during the 1940s large-capacity irrigation wells produced on average 41.3 acre-feet. This amount was multiplied by 717 wells, taken from Colorado's well data base in 1949, and then increased by 6.1 percent to include wells under 100 gpm. Colo. Oral Argument Memorandum at 26-27.

on by the USGS in 1964-68 was limited to irrigation wells of 100 gpm or more located in the valley-fill aquifer. That is what the text of the report states, and Kansas has not disputed the study area for those years. Jt. Exh. 66 at 1, 10 (Table 2); Kan. Supplemental Comments at 13. But that is not to say that the pumping estimates for the earlier years, namely 1940-63, were collected for the same area. Nor is the USGS study (Joint Exhibit 66) the only report that must be considered.

In 1968 the Wheeler Report, done at the request of the Colorado legislature, was published. Pumping estimates in the Wheeler Report for the 1940s are close, but not identical, to the USGS figures for the same period of time. Jt. Exh. 92 at 22; Jt. Exh. 94, Table 7 at 22. Pumping in 1940, according to Wheeler, was put at 2,300 acre-feet; increasing to 15,000 acre-feet during the years (1946-48) when the compact was being negotiated; and averaging 10,600 acre-feet for the 1940-49 period. *Id.* Significantly, however, the Wheeler Report *does* include the wells located on the Bessemer Terrace, that is, in the surficial aquifer. Jt. Exh. 92 at A-10. For the Bessemer Canal, the Wheeler Report lists 301 wells in the Bessemer Terrace and 47 in the alluvium. Moreover, the well data for 1940-65 was said to have been obtained from the Colorado Water Conservation District, based on maps plotted from the USGS study. *Id.* at 22-23.

No one is sure how the pumping estimates before 1963 were reached. RT Vol. 133 at 49. Yet it is clear that the only power records available for that period were based on utility service areas. Colo. Exh. 165*, Table 2.1. There were no distinctions in the power records between electricity supplied to wells located in the valley fill

aquifer and those in the surficial aquifer. Nor do later reports referring to or incorporating the USGS early pumping estimates indicate that they were limited to the valley fill aquifer.[67]

In short, I find that the evidence does not support the Colorado claim that pumping from the surficial aquifer was omitted from the precompact estimates, requiring an increase in the 15,000 acre-feet figure used in this Report.

Nor am I persuaded that the precompact pumping estimate should be increased to account for small-capacity irrigation wells, or for climatic conditions. Colorado's claim for a 6.1 percent increase for small capacity wells is based on the argument that for 1964-68 the Kansas pumping estimates exceeded those of the USGS by 6.1 percent. Colo. Oral Argument Memorandum at 24-25. Admittedly, the Kansas figures included wells of 50 gpm capacity, while for those years the USGS inventoried only wells of 100 gpm or more. But there is no evidence that the difference in pumping estimates can be attributed to the differences in well capacities. Indeed, for all but one of the years *before* 1964, the Kansas pumping estimates prepared for this trial were less than the USGS figures. Colo.

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[67] Jt. Exh. 92 at 22 refers to 1940-65 pumping from the "Arkansas Valley." Jt. Exh. 94 speaks of wells "tapping the alluvium of the Arkansas River Valley," and lists wells "Drilled Annually – Arkansas River," (1940-72) at 17, 19. The 1985 USGS Report incorporates the earlier BDR 21 data as estimates of pumping "ground water in the Arkansas Valley," and refers to problems caused by withdrawals "from alluvial aquifers." Jt. Exh. 129 at 9.

Exh. 993. Nor did I adopt the Kansas estimates to establish a precompact pumping allowance.

With respect to any climate adjustment, it certainly is true that pumping may vary depending upon the weather and the amount of river flow available for surface diversions. However, the conclusion that precompact pumping, except for some wet years, would have been 15 percent greater is highly speculative.

Finally, Colorado attempted during oral argument on the Draft Report to justify a higher precompact pumping allowance by making various comparisons of the amounts of water pumped per well. This effort included comparisons with precompact wells in Kansas, and also a comparison of the average pumping per well in Colorado as calculated by Kansas for the 1950s and 1960s. However, the foundation is simply insufficient to make meaningful comparisons of this kind. Arithmetical averages alone are not useful without evidence to analyze the shift from centrifugal to vertical turbine pumps, without considering the changing distribution bet electric and nonelectric wells, and without knowing the different geologic conditions that affect well productivity.

There is no precise answer to the amount of precompact pumping, or even as to the particular years that should be considered in making a compact allowance. That amount must simply remain as an estimate of water use that affected the general allocation of water between the states when the compact was being negotiated. Two responsible reports, one published by the USGS and one prepared for the Colorado legislature, reached similar

conclusions as to the amounts of Colorado pumping during the 1940s. These reports were done much closer to the time period involved, and without the pressure of trial advocacy. They have since been used by the Colorado State Engineer. I have relied on these reports and recommend that the highest annual amount shown to have been pumped during the negotiations, namely 15,000 acre-feet, should be allowed under the compact.

SECTION XVI

POSTCOMPACT PUMPING IN COLORADO

Establishing the total amount of water pumped by wells along the Arkansas River during the postcompact years is one of the major issues in the case. It is not a matter easily resolved. Colorado generally does not require meters on wells, and has had no comprehensive system calling for reports of the amounts of water pumped. RT Vol. 65 at 78-79; RT Vol. 67 at 114-16. Colorado State Engineer Simpson did testify, however, that he is now requiring the two major well organizations in the Arkansas River Valley to measure power coefficients and to estimate pumping based on power records. RT Vol. 130 at 52-53. The Water Court decrees establishing appropriative rights for wells do so in terms of a rate of flow (cfs), and do not limit the quantity of water that may be pumped, although the permitted acreage may be restricted. RT Vol. 65 at 75. It was necessary, therefore, for both states to develop their own pumping estimates for the postcompact period, that is, from 1950 to 1985.

Pumping estimates are sometimes made through the consumptive-use method, which is based upon crop demand, irrigation efficiency, effective precipitation, and surface water supply. However, these variables are not commonly measured or known with much accuracy. Another recognized method, which in fact was used in this case, is based upon energy consumption. This system requires data on the amount of energy supplied to the

well, and the development of a "power coefficient."[68] This factor is the amount of power required to pump a unit volume of water. Estimates from this methodology can be quite reliable if the basic data are complete. However, as might be expected in any effort to reconstruct pumping as far back as 1950, problems exist with the data. The efforts made by the experts for both states were indeed commendable, and their results differed by only about 10%.[69] However, that percentage difference still amounts to a considerable amount of water over the full postcompact period.

A. Kansas' Estimate of Pumping.

Kansas estimates that pumping along the Arkansas River in Colorado between Pueblo and the Stateline, over the 1950-85 period, amounted to 5,810,000 acre-feet. Kan. Exh. 731.[70] This amount includes wells located in both the valley fill and bench aquifers. It is limited to irrigation wells, and does not include municipal or industrial pumping. Average annual pumping over the 36-year

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[68] Sometimes described also as the "power consumption coefficient," or "power conversion factor," or "energy consumption factor."

[69] Dale E. Book of Spronk Water Engineers, Inc. did the work for Kansas. Colorado used Boyle Engineering Corporation, and James E. Slattery was the principal author of Boyle's report on pumping. Colo. Exh. 165*.

[70] In an earlier exhibit, Kansas originally estimated total pumping at 5,934,370 acre-feet. Kan. Exh. 32. However, the 5.81 million acre-feet (MAF) figure is the amount used by Kansas in its revised H-I model.

postcompact period amounted to 161,394 acre-feet. Kan. Exhs. 689, 731.

B. Colorado's Estimate of Pumping.

Colorado's estimate of total pumping over the 1950-85 period is 5,227,000 acre-feet. Kan. Exh. 731. The annual average is 145,200. Colo. Exh. 852. Colorado's estimate was also limited to irrigation wells, but only for those located in the greater of the ditch service areas or the valley fill aquifer. Colo. Exh. 165* at 1. The difference between the total pumping estimates of the two states over the 1950-85 period is 580,000 acre-feet.

C. Estimates of the Number of Wells.

The states also differ on the number of wells. Kansas inventoried wells with a capacity of more than 50 gallons per minute (gpm), and found that the total number of such wells in Colorado in 1985 was 2,543. Colo. Exh. 851. Colorado, on the other hand, used 100 gpm as its criterion for an irrigation well in order to coincide with the definition used by the USGS in its Basic-Data Release No. 21 (BDR No. 21). Jt. Exh. 66. Colorado's total for number of wells was 2057. Colo. Exh. 851. This total by Colorado represents permitted and decreed wells, which is not necessarily the same as the number of active wells located physically on the ground. RT Vol. 129 at 41-42. Finally, Kansas included wells located in the bench aquifers as well as those in the valley fill, while Colorado confined its analysis to a more limited "mainstem" area.

The difference, however, in the total number of wells reported by the two states is not significant for the purpose of estimating total pumping. Colorado prepared a comprehensive comparison of the wells located in the valley fill aquifer, which is where most of the wells are located. The comparison was limited to wells of 100 gpm or more. Colo. Exhs. 403a*-c*, 788; RT Vol. 68 at 63. Using this common basis, Colorado concluded that Kansas listed 137 wells that Colorado did not include, and that Colorado listed 93 wells not shown by Kansas. Colo. Exh. 788. The net difference was 44 wells, with a total of 1717 wells being identified by Kansas and 1673 by Colorado. Book agreed that this exhibit was correct. RT Vol. 125 at 35.

Simpson testified there were roughly 50 more alluvial wells under 100 gpm that could be added to the difference. RT Vol. 68 at 66. However, Colorado did not believe that these smaller wells were significant. At most a well of such size can irrigate only 4 or 5 acres. RT Vol. 68 at 73. According to the Colorado analysis, which appears to be carefully done and reliable, Colorado's slightly smaller number of wells is due primarily to the following factors: a Colorado field survey that found that certain wells listed by Kansas were not in fact used; the fact that some of the Kansas wells were duplicated in its computations; and the fact that Kansas included some old wells constructed before 1957 which had never been adjudicated. Colorado in its inventory assumed that these unadjudicated wells had been abandoned or were not in use. RT Vol. 68 at 66-67. On the other hand, Colorado listed 81 adjudicated wells that Kansas did not show. RT Vol. 68 at 71. In short, the difference in the total number of wells is

not as large as it first appears, but of more importance, both Book and Slattery agreed that the difference is not significant considering how the data were used. RT Vol. 125 at 36; RT Vol. 70 at 59-60.

D. Common Methodology Used by the States.

Both states generally use the same methodology in order to estimate total pumping. The first step is to assemble the records of electric power consumed for irrigation purposes in the Arkansas River Valley. A number of utilities supplied such power: Southeast Colorado Power Association (SECPA), Southern Colorado Power Company (CENTEL), Lamar Light and Power, Las Animas Municipal Light and Power, the Town of Holly. Records of the Colorado Public Utilities Commission were examined, and Colorado also utilized records from Colorado State University. Power used to supply "lift pumps" is subtracted from these data. A lift pump is not used to extract water from a well, but typically is a "ditch pump" lifting water from a canal to a higher elevation.

Two of these power companies, SECPA and CENTEL, also served electricity for irrigation purposes outside of the Arkansas River Valley. It was necessary therefore to segregate from total energy deliveries the amount of power used by wells along the Arkansas River within the respective study areas of the states. The distribution of SECPA power is in substantial dispute. Both states then applied power coefficients, or power conversion factors, to translate kilowatt hours into acre-feet pumped. For this purpose, both states relied upon power coefficients developed by the USGS during its 1964-68 study, BDR No. 21.

Jt. Exh. 66. In that study the USGS identified 1348 large irrigation wells (over 100 gpm) located in the valley fill aquifer. Data on well location, depth of well, depth to water, discharge rate, and the power source (electricity or gas) were collected for most of these wells. In addition, spring and fall water level measurements were taken over the 1964-68 period, and the electric and gas meters on the wells were read at the same time. *Id.* at 2, 4.

A power coefficient is dependent upon a number of factors, including pump and motor efficiency, well head discharge pressure, and the pump lift (number of feet between the groundwater level and the surface of the ground). Both states made adjustments to the power coefficients for changes over time in the groundwater levels, but only Colorado made a further adjustment for pump efficiencies. RT Vol. 69 at 70-71, 115, 122.

Lastly, both states made adjustments for pumping by nonelectric wells. There were no records available of fuel used, such as natural gas, to drive the pumps on nonelectric wells. However, in its 1964-68 study the USGS did inventory the nonelectric wells. This inventory is considered to be reliable for the 1964-68 period. Colo. Exh. 165* at 12.

In comparing the pumping estimates of the two states, the most significant differences result from: the allocation of Southeast Colorado Power Association energy to the study area along the Arkansas River; the adjustments made by Colorado to the power coefficients for pump efficiencies; and the amounts of extractions assigned to nonelectric pumping. Each of these differences is now discussed.

E. The Allocation of Southeast Colorado Power Association (SECPA) Energy.

In the SECPA service area, computerized section-by-section records were available for the period 1977-1985. These data were used by the experts for both states to allocate power to their respective study areas, and the resulting pumping estimates during this period were quite similar. The differences arise during the years 1950-76. During this period of time, the opposing methods of allocation of SECPA energy to the mainstem area account for an average pumping difference of 12,474 acre-feet per year. Colo. Exh. 822 at 2. Spread over the entire 1950-85 period, Colorado attributes an average of 9356 acre-feet per year of the total pumping difference to the SECPA issue. Colo. Exh. 822, Table 1.0.

Complete ledger billing sheets from SECPA were available for the years 1953-60 and 1973-74, but were incomplete during the intervening years. These ledger sheets contained the data used for customer billing, including meter readings and the locations of meters. Kan. Exh. 627. For the years when the ledger sheets were complete, Kansas relied upon them directly to make the necessary allocation of SECPA energy. For the 1961-72 period, when complete ledger sheets were not available, Kansas estimated the portion of total irrigation energy supplied to the mainstem area based on percentages of the total power for the periods prior and subsequent to 1961-72. Colo. Exh. 660 at 5.

Colorado agrees that these ledger sheets, if they could be accurately interpreted, "would provide a better

basis to allocate power in the SECPA service area to the mainstem area than the percentages used by Mr. Slattery," Colorado's expert. Colo. Response Br. at 81. However, Colorado maintains that the ledger sheets required too much interpretation to be reliable, and therefore used none of them. RT Vol. 70 at 17; RT Vol. 72 at 109-13. Instead, Colorado allocated SECPA energy for 1968-77 essentially on the basis of a straight line interpolation between the values used by the USGS in its 1964-68 study and SECPA's computerized records that became available in 1977. In the years before 1964 for which it did not have records, Colorado relied upon correlations that it developed with other electric suppliers. Power records generally were incomplete for the 1940-60 period, and missing records were estimated using regression techniques. Colo. Exh. 165* at 3. Because of the deficiencies in its power data, Colorado's expert testified that his pumping estimates for the years prior to 1960 had a range of uncertainty of "probably about plus or minus 20 percent." RT Vol. 69 at 94.

The dispute over allocating SECPA energy resulted in very large differences in the annual pumping estimates from 1971 through 1976, ranging from 21,163 acre-feet to 60,247 acre-feet. Colo. Exh. 822, Table 1.0. In each instance the Colorado estimate was lower. The largest difference of 60,247 acre-feet occurs in 1974 when complete ledger sheets were available and were used by Kansas but not by Colorado. The SECPA issue largely turns on a question of whether these ledger sheets were more reliable than the interpolations and correlations utilized by Colorado.

Colorado's expert Slattery testified that use of the ledger sheets involved "a great deal of interpretation"

and the possibility of error made them an unreliable source of data. RT Vol. 71 at 139; RT Vol. 70 at 17. Slattery also added, however, that the ledger sheets were not used because of "the level of effort of digitizing that large of a data base." RT Vol. 70 at 17. Kansas had offered one of the ledger sheets in evidence as an example. Kan. Exh. 627. Slattery acknowledged that this particular sample was simple to read, but said that it was an exception. RT Vol. 72 at 30, 103, 113. Slattery then produced another ledger sheet that he claimed was more difficult to read and would be more typical of the type that was generally available. Colo. Exh. 811; RT Vol. 72 at 113. Slattery testified that this example was subject to a series of different interpretations, and was "very confusing" to him. RT Vol. 72 at 110.

With the acquiescence of counsel, I called Kansas' expert witness Book back to the stand, without warning, to see if he could read this ledger sheet. RT Vol. 72 at 114. Book showed no hesitation, and had no difficulty in extracting all of the pertinent information from the ledger sheet. RT Vol. 72 at 133-41. Interpretation of the sheets, he acknowledged, required care but posed no problem. RT Vol. 72 at 137.

For the years 1957 and 1958 the amount of energy allocated to the mainstem area by Kansas on the basis of summing up all of the ledger sheets slightly exceeded the total amount of power reported to have been supplied by SECPA. RT Vol. 70 at 12; Colo. Exh. 660, Table 1A. The reported total company production came from records filed with Colorado State University, under a voluntary program. RT Vol. 62 at 40-41; RT Vol. 72 at 38-39. Colorado cites this inconsistency as another reason why the

ledger sheets could not be used reliably. Colo. Response Br. at 81-82. Indeed, because of these two years Slattery concluded that the ledger sheets overestimated power for all the years. This argument assumes, however, that the Colorado State University records for those two years were more accurate than Kansas' interpretation of the ledger sheets. There was no evidence establishing the accuracy or completeness of the reports filed with the university, while we do know that the ledger sheets were used to bill customers for the amounts of power shown.

In the years 1973 and 1974, which were far more important to the pumping estimates than 1957-58, Kansas' summation of the ledger sheets allocated 75% and 74%, respectively, of the company's total power sales to the mainstem area. Colo. Response Br. at 82. These percentages compare favorably to Slattery's testimony that over all the years about 80% of the SECPA energy was delivered to the mainstem area. RT Vol. 72 at 96. In contrast, the Colorado allocation to the mainstem area for 1974 was only 44%. RT Vol. 72 at 49.

Colorado relies heavily on the USGS 1964-68 study. Jt. Exh. 66. One of the authors of that study testified that the USGS also used individual ledger sheets obtained from the power companies, that he considered them to be as accurate as any information one could get, and that they were "very clear," not difficult to read or understand. RT Vol. 129 at 26, 36.

I find that the ledger sheets provide the best source of data available for allocating the amount of SECPA energy delivered to the study area along the Arkansas River, and that such data can be reliably used. I find

further that Kansas' allocation of SECPA energy, based upon the use of the ledger sheets, provides the most reliable estimate of power supplied to the study area, and should be used in determining the amount of pumping in that area.

F. Pumping from Nonelectric Wells.

While the large majority of pumps in the Arkansas Valley have been operated with electrical energy, a considerable amount of water has also been produced using nonelectric pumps, that is, pumps driven by natural gas, diesel or gasoline fuels. The differences between the states in estimating the amount of such nonelectric pumping average 4511 acre-feet annually over the 1950-85 period. Colo. Exh. 822 at 3. Kansas' estimate is higher considering the whole postcompact period, although in the earlier years Colorado estimated higher amounts of nonelectric pumping. Virtually no data are available on the amounts of energy supplied to nonelectric wells over the 1950-85 period.

The only comprehensive study of nonelectric wells was made by the USGS as part of its 1964-68 investigation. The USGS not only inventoried the various kinds of nonelectric wells, but also assembled data from which pumping estimates from these wells could be made. Of 1342 active wells for which the power source was reported, the USGS found 1136 electric wells and 206 nonelectric wells. Colo. Exh. 165*, Table 7.1. The nonelectric wells were further divided into 62 natural gas wells and 144 diesel or gasoline wells. In all, they comprised about 18% of the wells studied.

Kansas used microfilm data for the year 1968 taken from that USGS study to determine the ratio of electric to nonelectric pumping for 1968. RT Vol. 126 at 48. The Kansas experts then applied that same ratio to later years, but subject to a "cap." The cap actually amounted to 26,900 acre-feet annually, which was the amount of nonelectric pumping calculated by Kansas for 1968. Kan. Exh. 689 at 3. The use of the cap stabilized nonelectric pumping at 26,900 acre-feet for each year from 1971 through 1982. Colo. Exh. 822, Table 4.0. For the years 1983-85, the amount was slightly less. The Kansas approach thus limited any increase in nonelectric pumping during the dry years of the 1970s, but it did not take into account evidence that the number of nonelectric wells decreased over the years.

Colorado, in making its estimates of nonelectric pumping, relied not only upon the 1964-68 USGS data, but also upon several localized studies, and upon the experience of two irrigation experts who had worked in the Arkansas Valley for many years. Two of these localized inventories of nonelectric wells were made in the 1940s. Colo. Exh. 165*, Table 7.1. A more comprehensive inventory was made by the Colorado state engineer in 1985. Of 887 wells included in the 1985 report, 825 were electric and 62 or about 6% were nonelectric (58 natural gas wells and 4 diesel wells). *Id.* In 1991 the Colorado state engineer's office also completed a field investigation of a limited number of wells located downstream from John Martin Reservoir under the Buffalo Canal, and located south of the river in the area served only by wells. RT Vol. 68 at 76-77; RT Vol. 126 at 50. Between 40 and 50 wells were included in this survey.

Within the Buffalo Canal service area 14.5% of the wells were nonelectric, and in the area south of the river the figure was 9.5%. RT Vol. 68 at 76; RT Vol. 126 at 45-46.

Unlike Kansas, Colorado based its estimates of nonelectric pumping upon a declining ratio of nonelectric to electric pumping over time. There is substantial evidence in the record, uncontroverted by Kansas, that the number of nonelectric wells has decreased over time. Besides the several inventories noted above, this conclusion is firmly supported by the testimony of Robert A. Longenbaugh and Donald L. Miles. Mr. Longenbaugh has been employed by the Colorado Division of Water Resources since 1981, and when he testified was an assistant state engineer. Prior to 1981 he was with Colorado State University for 19 years, serving as an Extension Irrigation Specialist and an Associate Professor in civil engineering. He was responsible for maintaining an observation well network of approximately 1200 wells in Colorado, begun by CSU in 1929; he worked on many projects involving irrigation and pump efficiencies along the Arkansas River; and he coauthored a textbook chapter on farm pumps. Kan. Exh. 624.

Until his retirement in 1988, Mr. Miles worked for more than 20 years with the Cooperative Extension Service associated with Colorado State University, and for some 15 years was stationed at Rocky Ford on the Arkansas River. Moreover, he grew up on a farm under the Fort Lyon Canal. He published a wide range of research reports and articles, and worked closely with farmers helping them to make management decisions.

Both Miles and Longenbaugh had years of personal experience as irrigation experts assisting farmers along the Arkansas River.

Longenbaugh and Miles testified that natural gas prices rose significantly in the early 1970s because of the Arab oil embargo. RT Vol. 63 at 199; RT Vol. 65 at 151. Moreover, there were problems with the BTU rating of natural gas, and SECPA seized the moment to launch a heavy promotional effort to get farmers to convert to electricity. RT Vol. 65 at 151-52. As a result, there was a conversion from fossil fuel energy to electricity. Miles testified that at the present time about 97% of the wells valley-wide are electric. *Id*. The percentage would be a little lower downstream of John Martin Reservoir, where the bulk of the nonelectric wells are located. *Id*. Book also acknowledged that both natural gas and diesel prices had increased in the early 1970s, and indeed that some conversion to electricity had occurred. RT Vol. 23 at 107. The increase in the amount of SECPA power sold during this period of time may also suggest a significant conversion to electricity, although to some extent it may reflect increased pumping during the dry years. In 1973 SECPA sales along the Arkansas River were 6.7 million kWh. By 1976 this amount had increased to 18.1 million kWh. RT Vol. 23 at 109.

There is a good deal of uncertainty in the estimates of nonelectric pumping provided by both states. However, I find that the Colorado methodology more accurately accounts for the reduction in the number of nonelectric wells, which I believe did occur. Accordingly, the Kansas estimates for total pumping should be adjusted to reflect

the nonelectric pumping estimates calculated by Colorado.

G. Pumping Adjustment for Decline in Well Efficiencies.

There is no dispute over the fact that the efficiencies of both wells and pumping plants generally decline with age unless properly maintained. RT Vol. 23 at 105. Under those circumstances, a given amount of energy may in fact pump less water than when a well is more efficient, or put conversely, it may take more energy to produce the same amount of water. If pumping is to be estimated on the basis of energy supplied and the use of a power coefficient, it may be necessary therefore to adjust that coefficient over time. Colorado made such an adjustment to its pumping estimates. Kansas did not, believing that the facts did not warrant such a change. Colorado's pump efficiency adjustment reduced its estimate of total pumping by an average of 6618 acre feet annually for the period 1950-85. Colo. Exh. 822 at 4.

Colorado relied initially, as did Kansas, on the power coefficients measured by the USGS in its 1964-68 study. Colorado, however, then adjusted those power coefficients on the basis of certain random measurements made in 1981. The 1981 investigation was part of a national program to measure power coefficients, and involved 72 wells along the Arkansas River in Colorado. Kan. Exh. 625; RT Vol. 71 at 131. Colorado expert Slattery acknowledged that this was a relatively small sample of recent power coefficients. RT Vol. 71 at 114. Also, it was not possible to equate the 1981 measurements with values

used for specific wells in the 1964-68 study. RT Vol. 69 at 126. Nonetheless, Slattery testified that the decline in pump efficiencies shown by these 1981 measurements corresponded to the opinions of Longenbaugh and Miles. RT Vol. 69 at 125, 127; RT Vol. 72 at 14, 25-26. Accordingly, Slattery developed a declining relationship between the 1964-68 and 1981 measurements, which essentially was on a straight line basis. RT Vol. 69 at 132; RT Vol. 72 at 6.

Kansas received the 1981 data during the discovery period of this case, but Book concluded that such data "did not indicate a sufficient decline in efficiency of the pumping units for 1965 to 1981" to warrant any change. Moreover, he believed that the results were heavily influenced by an "outlier" in the data, and that the Colorado analysis did not appropriately consider pump replacements. RT Vol. 125 at 42. Book assumed that pump replacement "would happen logically through the aging of the pumps and wells in the valley." *Id.*

Book's assumption, however, was vigorously disputed by Longenbaugh. On the basis of his extensive personal experience along the Arkansas River, Longenbaugh testified that efficiencies had decreased considerably over time "because of the wear of the pump and that they [farmers] don't change out the pumps." RT Vol. 63 at 190; RT Vol. 69 at 125; RT Vol. 71 at 116. There was little economic incentive to do so. RT Vol. 63 at 185. Speaking of his efforts in working with farmers to make their irrigation systems more efficient, Longenbaugh testified:

> "It cost more to get the well driller and the pump installer to go and pull the pump and put it back in than what they could save in power bills over a several year period. There was no

> incentive for them to go ahead and do it. I was amazed when I did the numbers and that is what it came out to be." RT Vol. 63 at 185.

Into the 1970s, power was sold at a declining block rate so that the more power a farmer used, the less it cost. RT Vol. 63 at 191. Most farmers did not use their wells every day, and so if additional water was needed, the farmer merely pumped another day. RT Vol. 65 at 70. Miles was also of the opinion that the efficiency of wells in existence during the 1960s had declined. RT Vol. 66 at 31. Additionally, he pointed out that some changes in irrigation systems had adversely impacted pump efficiencies. Farmers used to pump into open ditches, but many systems changed over to underground pipelines, creating an additional head on the pump and requiring more power for the same volume of water. RT Vol. 66 at 27; RT Vol. 63 at 190.

Longenbaugh testified that pump efficiencies during the 1960s were about 45-50%. In the 1980s, in his opinion, those efficiencies had declined to approximately 40-45%. RT Vol. 71 at 127. Miles testified that in his opinion even the latter efficiencies were too high under current conditions. RT Vol. 66 at 25-27. The calculations which Slattery used to adjust the 1964-68 pump efficiencies generally fell within Longenbaugh's range. RT Vol. 72 at 5. Slattery testified that he had relied "very heavily" on Longenbaugh. RT Vol. 71 at 119; RT Vol. 69 at 125.

Slattery acknowledged that he had no actual data on pump replacements, and had used the age of wells as a surrogate for the average age of pumps. RT Vol. 71 at 121. But neither did Kansas have any data on pump replacements. Very few new wells, and few replacement wells,

were drilled upstream of John Martin reservoir after 1965. Colo. Exh. 165*, Table A.1; RT Vol. 71 at 115-16. While wells continued to be drilled downstream of John Martin after 1965, the ratio of older to newer wells was still 490 wells in 1965 compared to 90 wells added thereafter through 1985. Colo. Exh. 165*, Table A.1. Longenbaugh thought that ages of the wells gave an indication of average pump age. RT Vol. 71 at 115.

On cross-examination, Kansas raised legitimate questions about the impact of one data point (Bland well) used in the 1981 study, and whether the 1981 measurements, although random, were truly representative. RT Vol. 72 at 9-19; RT Vol. 72 at 106-07. Kansas also uncovered a mistake in one of the power coefficients used by Slattery which had resulted in an underestimation of center pivot pumping from 1971 to 1985 of 300-400 acre-feet annually. RT Vol. 72 at 67, 123-24. Overall, however, Kansas offered no evidence of its own on pump efficiencies after the 1964-68 USGS measurements. Book made no independent investigation to determine how frequently pumps were repaired or replaced. RT Vol. 23 at 106.

The Kansas experts certainly understood that well efficiencies can decline with age, and that the power coefficients on which they relied were some twenty years old. Kansas failed to show that its pumping estimates did not require an adjustment because of declining pump efficiencies. While certainly the data relied upon by Colorado to reach specific acre-feet values were not as complete as might be desired, I find that the 1964-68 power coefficients on average did decline, and that an appropriate adjustment is required. The Colorado evidence is accepted.

H. Conclusions.

I conclude that the best estimate for total postcompact pumping for the 1950-85 period is 5,810,000 acre-feet, less the adjustments submitted by Colorado for declining pump efficiencies (corrected for the center pivot coefficient mistake), and less the adjustments utilizing Colorado's calculations for nonelectric pumping.

SECTION XVII

WELL DEVELOPMENT IN KANSAS

Colorado points to the fact that the large increase in postcompact wells did not occur only in Colorado, and that in western Kansas a comparable if not greater proliferation of new wells also occurred. Colorado argues that new wells increased the irrigated acreage in western Kansas to more than 300,000 acres; that such pumping has caused groundwater levels to decline substantially; that groundwater contributions to the Arkansas River in Kansas have been reduced or eliminated; that increased pumping has caused greater transit losses in the river, depleting the flows available to Kansas ditches; and that until 1978, Kansas took no action to restrict well development in western Kansas. All these facts are basically true, but they do not constitute a defense to Colorado's liability under the compact.

Article IV-D of the Arkansas River Compact protects the "waters of the Arkansas River" against material depletion from future development, which indeed includes development in Kansas as well as Colorado. However, the waters of the river are defined as those originating "upstream from the Stateline." Article III-B. The excessive pumping by Kansas farmers is essentially mining the Ogallala Aquifer. Jt. Exh. 140 at 1. While this may portend serious problems for Kansas in the future, the Ogallala groundwater supply in Kansas is not directly covered by the compact.

A. Irrigated Acreage in Kansas.

At the time the compact was approved, the acreage in Kansas irrigated by surface diversions and wells between the Stateline and Garden City was in the order of 66,000 acres.[71] RT Vol. 36 at 53; Kan. Exh. 348 at 34; RT Vol. 37 at 136-37. The evidence does not permit a breakdown between acreage supplied by alluvial wells and acreage irrigated by nonalluvial wells, if any. A recent study shows that land irrigated from the Arkansas River, that is, by surface diversions and alluvial wells, is about 57,000 acres. Kan. Exh. 358*.

Colorado refers to the acreage irrigated in 1979 in Hamilton, Kearny and Finney Counties, a total of some 351,000 acres. Jt. Exh. 139 at 15; Jt. Exh. 140 at 11; Colo. Closing Well Br. at 25. However, much of this land is outside of the service areas of the Kansas canal companies that divert from the Arkansas River. Most of the new acreage is irrigated by wells drawing from the Ogallala Aquifer, not from the Arkansas River or its alluvium. About 100,000 acres of the new irrigation referred to by Colorado were developed from the mid-1960s through the 1970s in sand hills south of the river. RT Vol. 37 at 24. This area is outside the service area of South Side Ditch, and is irrigated solely by wells using center pivot sprinklers. *Id.* at 24-27. It was the development of the center pivot system that made irrigation in this area possible.

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[71] Kramer's Report to Congress in 1949 uses the figure of approximately 65,000 acres. Jt. Exh. 16 at 37.

In Hamilton County, upstream of the Bear Creek Fault zone, there is no association between the Arkansas River and the Ogallala formation. In that reach, the river alluvium is contained in a trough eroded through bedrock. RT Vol. 29 at 134. Downstream of the fault zone, essentially in Kearny and Finney Counties, the river alluvium is separated from the Ogallala Aquifer by a "major confining zone" which consists of silt, sandy silt and clay. RT Vol. 30 at 47-49. This confining zone, which ranges from near zero to about 200 feet thick, is not an aquifer and does not provide water to wells.[72] *Id*. at 49; Jt. Exh. 140 at 8. While there is some opportunity for the vertical movement of water through the confining zone, the upper alluvial aquifer and the lower Ogallala Aquifer "act independently." RT Vol. 30 at 49, 78. It is common knowledge, of course, that the Ogallala underlies a vast area encompassing parts of several states. There was no evidence that such groundwater came from the waters of the Arkansas River originating in Colorado.

B. Increase in Kansas Wells.

The increase in the number of wells in western Kansas is shown decade by decade in a series of maps introduced by Colorado. Colo. Exhs. 284* through 289*. In 1949 there were about 416 wells in the three-county area from the Stateline to Garden City. Colo. Exh. 257*. This

[72] The hydraulic conductivity of this zone is "very low," ranging from 1/100 to 1/10,000 of a foot per day. This compares with hydraulic conductivity in the upper alluvial aquifer of 82 to 200 feet per day, and 80 to 150 feet per day in the lower Ogallala Aquifer. RT Vol. 30 at 47-49.

number had increased to 1999 in 1985. *Id*; RT Vol. 86 at 109-111. These totals, however, include wells located outside of the ditch service areas, and wells not pumping from the alluvium of the river. RT Vol. 86 at 108-09; Jt. Exhs. 139, 140.

Since the 1960s, alluvial wells generally have not been drilled. RT Vol. 28 at 68. Both new and replacement wells, inside and outside of the ditch service areas, have been drilled into the Ogallala formation. *Id*. at 68, 85. The river alluvium is now largely dewatered, and the deeper Ogallala wells are not even perforated in the alluvium. *Id*. at 64. Water levels in the Ogallala have been declining since the 1950s, from 20 to 90 feet depending upon the location. *Id*. at 73; Jt. Exh. 140 at 1. In 1950, an average Ogallala well pumped between 1,500 and 2,000 gallons per minute. Today, the typical yield of an Ogallala well ranges from 650 to 1,000 gpm. RT Vol. 28 at 81. For the period 1968-85, pumping within the canal company service areas has averaged about 79,400 acre-feet annually, reaching a high of 149,800 in 1981. Kan. Exh. 327 at 9, Table 10A. Surface diversions during this period averaged 58,400 acre-feet annually. *Id*.

C. Impacts of Pumping in Kansas.

In 1977 the Kansas Division of Water Resources entered into a five-year cooperative investigation with the USGS. The purpose was to better define the relationships among groundwater, surface flow and climatic factors along the Arkansas River, and to evaluate the impacts of pumping on streamflow. Jt. Exh. 139 at 3. The study was divided into two phases, Phase I being

upstream of the Bear Creek Fault zone, and Phase II downstream. The results were published in 1983 for Phase I and 1985 for Phase II. Jt. Exhs. 139 and 140, respectively.

As part of its Phase I investigation upstream of the Bear Creek Fault zone, the USGS found that average streamflow at Syracuse (about 15 miles below the Colorado-Kansas border) had declined from 173,000 acre-feet during 1951-69 to 65,000 acre-feet during 1970-79. Jt. Exh. 139 at 1. During the 1970s, pumping in this reach of the river increased from 20,000 acre-feet in 1970, with fewer than 100 wells, to nearly 65,000 acre-feet in 1979, with some 160 wells. *Id.* at 53. Static water levels in the alluvial aquifer declined during the 1970s by about 4 feet. *Id.*

In the early postcompact years, i.e., 1951-69, this portion of the river was in hydrologic equilibrium. About as much water came into the stream-aquifer system as was discharged from it. *Id.* at 55. Since the "prolonged streamflow reductions" beginning about 1970, the USGS found that discharge exceeded recharge. *Id.* The USGS concluded that water levels and streamflow within the study area were "more directly affected by the reductions in incoming streamflow . . . than by either the smaller than average amounts of annual precipitation or the increased pumpage during the 1970s." *Id.*

In the area downstream of the Bear Creek Fault zone, under predevelopment conditions the groundwater levels and hydraulic head (pressure) in the Ogallala Aquifer resulted in upward leakage into the alluvial aquifer and the Arkansas River. RT Vol. 30 at 67; Jt. Exh. 140 at 22. But

this condition changed with increased pumping, and during the 1970s water leaked from the upper down into the lower aquifer. RT Vol. 30 at 68; Jt. Exh. 140 at 8, 22. Phase II of the USGS study embraces this area from the fault zone to a point slightly downstream of Garden City, a distance of about 45 miles. Jt. Exh. 140 at 2, 7.

The lower or Ogallala Aquifer is the source for virtually all of the groundwater pumped in this Phase II area. *Id.* at 8. One study cited by the USGS estimated that in 1980 approximately 2,900 wells pumped about 738,000 acre-feet of water. *Id.* at 11 The aquifer is being heavily mined. In 1980 the USGS model indicated that 307,600 acre-feet were withdrawn from storage. *Id.* at 51. The upper or alluvial aquifer has been dewatered since the mid-1970s. *Id.* at 48. However, considering the reach of the Arkansas River from the Bear Creek Fault zone to Garden City as a whole, the river has been a losing stream since 1923. *Id.* at 15. Most of the loss (recharge to the alluvial aquifer) from 1923-70 occurred in Finney County, but during the 1970s the river also lost flow throughout most of Kearny County. *Id.* This was the result of decreased river flow from upstream, and from pumping which lowered groundwater levels and reduced or eliminated groundwater contributions to the river. *Id.*

Kansas did not aggressively address these conditions until January of 1977 when the chief engineer of the Kansas Division of Water Resources declared a moratorium on the approval of new well applications in a 500 square mile area along the river in Hamilton and Kearny Counties. RT Vol. 37 at 53. (The moratorium did not include Finney County. Jt. Exh. 140 at 2.) Well permits have been required only since 1978. RT Vol. 28 at 6; RT

Vol. 37 at 27, 32. In 1986, as a follow-up to the moratorium, Kansas established an intensive groundwater use control area (IGUCA) which generally conforms to the alluvium from the Stateline to Garden City. Jt. Exh. 82 at 26-27. This area was designated under a 1982 Kansas statute authorizing the chief engineer to act when groundwater levels have declined "excessively," or pumping exceeds the rate of recharge. *Id.* at 3. Under this authority, David L. Pope, the Kansas chief engineer and a principal witness during the trial, closed the IGUCA to any new appropriation of groundwater or surface water, except for domestic uses. *Id.* at 29. There has been no action, however, to restrict the quantities of water pumped from wells with existing permits. RT Vol. 37 at 56.

Colorado could be affected by the pumping in Kansas in two ways. First, under the compact and absent the 1980 Operating Plan, neither state is allocated a specific share of the water stored in the conservation pool in John Martin Reservoir. Instead, the stored water is a common resource to be released ". . . upon demands by Colorado and Kansas concurrently or separately at any time during the summer storage period." Article V-C. Helton and others testified that the development of postcompact wells in Kansas reduced the usable flow of the river in Kansas by increasing seepage or what was termed "transit losses." Indeed, this appears to be true, although the extent may be in issue. In any event, the result could mean additional demands by Kansas on the stored waters in John Martin Reservoir, thereby reducing the amount available to Colorado.

However, Helton testified that these potential consequences have not in fact occurred. He said that during the 1970s, any increased percolation of river water in Kansas would not have affected its use of conservation storage. At that time, he thought, Kansas would have called for the release of all such water without regard to transit losses. RT Vol. 115 at 33-34. Helton testified that before the 1970s river flows were not substantially impacted by the Kansas wells. *Id.* at 33. And, of course, after the 1980 Operating Plan was in effect Kansas had its own storage account in John Martin Reservoir and its use of that water did not affect Colorado's storage account. In short, the evidence shows that increased pumping in Kansas has not adversely impacted Colorado's supply.

Secondly, pumping in Kansas could affect the determination of usable flows at the Stateline. Under Spronk's analysis, flows contributing to increased groundwater recharge were treated the same as diversions. This was not true in the Durbin-Larson analyses. Each of these latter experts calculated flows for groundwater recharge on the basis of precompact conditions. However, I am recommending against using the Spronk methodology for this and other reasons, and increased pumping in Kansas will not affect the determination of usable flow at the Stateline if my recommendation is approved.

SECTION XVIII

KANSAS' ORIGINAL HYDROLOGIC-INSTITUTIONAL MODEL

During the preparation of this case, and during the first part of the trial, the chief technical witness for Kansas was Timothy J. Durbin. Mr. Durbin holds a Master of Science degree (1971) in civil engineering from Stanford, and is a former District Chief, California District, for the USGS. He joined the USGS in 1972 and has substantial experience in hydrologic modeling, primarily in California and Nevada.[73] He had no prior experience with the Arkansas River. He left the USGS for private practice in 1984, and soon joined the national firm of S. S. Papadopulos & Associates in charge of their Davis, California office. He began working for Kansas on this case, as part of the Papadopulos firm, in 1985. RT Vol. 39 at 65. In 1989 the Davis office of the firm was split off, and Kansas chose to remain with Durbin as its primary expert.

Durbin began his investigation on behalf of Kansas by examining seven possible causes of the depletions of Stateline flows: declines in High Plains runoff; declines in High Plains precipitation; changes in basin inflows; post-compact pumping in Colorado; the Winter Water Storage Program; the 1980 Operating Plan for John Martin Reservoir; and increased phreatophyte consumption. RT Vol. 39 at 66-67.

Durbin concluded that High Plains runoff was only a small portion of the overall water supply of the river and

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[73] A complete statement of his qualifications and experience is found in Kan. Exh. 485.

that changes in such runoff, either because of precipitation or land use practices, were not an explanation for Stateline depletions. RT Vol. 39 at 70. Those factors were dropped from consideration and Durbin concentrated his investigation on the five remaining potential causes of the declines in Stateline flows. Three separate approaches were used: a statistical analysis, a water budget analysis, and the hydrologic-institutional ("H-I") model. RT Vol. 39 at 72.

From the statistical and water budget analyses, which are both fairly traditional approaches, Durbin concluded that for a given basin inflow the Stateline flows were substantially lower in the late postcompact period (1970-85) than in the earlier postcompact period (1948-59), and that increased consumption within Colorado had caused the decline. Kan. Exh. 60*; RT Vol. 40 at 43-44; Kan. Exh. 99G; RT Vol. 41 at 120-21. So long as supply remains constant,[74] Durbin testified, streamflow depletions at the Stateline mean that somehow consumption has increased within Colorado. RT Vol. 39 at 73; RT Vol. 41 at 23-24. Durbin acknowledged, however, as did later Kansas experts, that the statistical plots did not provide an explanation for the decline, and that the water budget analysis did not quantify the effects of possible individual causes, e.g., pumping, the WWSP, or increased consumption by phreatophytes. Durbin testified that the

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[74] There has been no showing of a significant decline in inflow to the mainstem of the Arkansas River. Gaged tributary inflow shows a small decrease; the evidence on ungaged tributary inflow is in sharp conflict.

H-I model was developed in order to distribute the overall effects to individual causes. RT Vol. 39 at 73. Kansas' replacement expert Larson also confirmed that the only way to quantify the effects of an individual cause of depletions was through the modeling analysis. RT Vol. 127 at 135.

A. The Basic Structure of the H-I Model.

The H-I model is a computer model which receives input in the form of certain hydrologic data and institutional conditions, as well as the output of other analyses. The H-I model attempts to integrate both surface water and groundwater processes in the Arkansas River Basin from Pueblo to the Stateline. It represents an enormously difficult task, the complexities of which may not have been fully appreciated when Durbin began to develop the basic structure of the model.[75]

Mr. Durbin relied, somewhat optimistically I believe, upon an earlier model developed by the USGS for the same reach of the Arkansas River. Jt. Exh. 78. This model, too, integrated both groundwater and surface water operations, and according to Durbin was a hydrologic-institutional model. The report on the earlier USGS model was issued in 1974, and it covered the period from 1941 to 1965. However, the USGS model was designed only to make a broad assessment of twenty-four different water

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[75] In 1989, Dr. Lawrence J. Lefkoff, who received his doctorate degree from Stanford in 1988, began to assist Mr. Durbin, and ultimately became primarily responsible for certain portions of the H-I model analyses.

management plans. It was neither required nor intended to provide the level of accuracy and detail demanded in an adversarial trial. The simplifications used reflected the limited purpose of the model. For example, the model did not represent any winter diversions by Colorado ditches; it did not represent off-channel storage reservoirs; it did not represent conservation storage events in John Martin reservoir during the summer; and well pumping was not actually determined, but rather was based upon allowing wells to pump to their maximum capacity in order to satisfy the unmet demand of all the land under the respective ditches. This overestimated actual pumping. RT Vol. 86 at 139-42.

Typically, hydrologic models are used to predict future flows or conditions in light of certain assumed changes, such as the proposed construction of a reservoir. If the model has been properly verified to match historical conditions, reasonably reliable results can be expected. The computer modeling process is widely used and accepted. Indeed, it seems that no major water problem can now be solved without a model, even though models generally rely upon the future repetition of a past hydrologic cycle that is not likely to be the same. But in this case, the model must be used to unravel a more difficult problem than is usually addressed. The task is to determine what usable Stateline flows would have occurred if in fact certain actual historical events had been different, namely, if postcompact pumping had not increased, or if the Winter Water Storage Program had not been instituted. Not only are there critical data problems in the more distant years, but the process even

requires assumptions about what people would have done if their actual behavior had not been allowed.[76]

Dr. Freeze testified that groundwater models are generally accurate only between 10 and 20 percent. RT Vol. 70 at 137, 154. When groundwater models are integrated into an overall model involving surface flows, he testified that "large errors" could be expected and that they could exceed 20 percent. RT Vol. 70 at 150-54. Modeling a system like the Arkansas River would be "difficult," he said, though he acknowledged it would not be impossible. RT Vol. 70 at 153; RT Vol. 105 at 42. Asked about the sharp differences in modeling results in this case, Dr. Freeze said that the experts on both sides "are extremely well regarded," and are among the "best experts that there are in the country." RT Vol. 105 at 45. However, besides the inherent difficulties in trying to reproduce conditions over 36 years along 150 miles of river, and a certain lack

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[76] Dr. Robert Allan Freeze, one of the pioneers in the application of digital computer models to groundwater problems, put it this way:

> "The point you are making is that in classical modeling we are usually trying to go into the future. The what-if games we play in the classical model usually involve calibrating against what happened up to this point in time. Then predicting the future, what would happen if somebody did something different in the future. I understand the what-if games you are playing here. What-if things that happened in the past hadn't happened. So it is a different kind of game, yes." RT Vol. 105 at 41.

Dr. Freeze is a professor in geological engineering at the University of British Columbia who served on the Technical Advisory Committee organized by Colorado. His exceptional qualifications are found in Colo. Exh. 670.

of reliable data, he thought that the litigation process was partly responsible for the wide disagreements among the experts. It is a "new world" for such experts, he said, and a process that "drives us apart." RT Vol. 105 at 46.

The H-I model is actually an integrated family of models, modules and sub-routines. RT Vol. 42 at 29-30; RT Vol. 87 at 34. Included are two groundwater models for the valley fill aquifer and eight for the bench areas. For two particularly long canals (Fort Lyon and Amity), groundwater models were also developed to calculate individual response functions for canal seepage. Runoff from ungaged tributary basins was estimated by a rainfall-runoff model, and annual values from that model were distributed into monthly values through a special version of the H-I model, sometimes referred to as the "GLOBAL" version. The model predicted surface diversions, dividing the river into 18 reaches, and using 89 separate water rights for 23 canal companies. Another subroutine calculated the amount of water consumed by crop evapotranspiration, and the amount of applied water returned to the river as surface runoff or recharged to the groundwater system.

The study period for the H-I model runs from January 1950 through December 1985, a total of 432 months. Output from the model is provided at monthly time intervals. The model accounts for all major diversions from the Arkansas River between Pueblo and the Stateline, and for irrigation pumping from both the valley fill and bench aquifers. The model represents the off-channel reservoirs, as well as the operations of John Martin and Pueblo Reservoirs. Transmountain water which enters the

system at Pueblo is accounted for. Consumption by phreatophytes and river and reservoir evaporative losses are considered, as well as canal and lateral seepage losses. Irrigation return flows to the river, both on the surface and through the groundwater system, are represented for each canal service area. Tributary inflows from the major tributaries are included, along with precipitation within the study area. Water consumption processes, such as crop evapotranspiration and noncrop evapotranspiration are also included.

B. Original Results of the H-I Model.

The H-I model evaluated four separate institutional conditions: postcompact pumping; the Winter Water Storage Program; transmountain water imports; and the 1980 Operating Plan for John Martin Reservoir. The inclusion or exclusion of these four institutional conditions as they were used in various model runs were often described as being controlled by "switches." In the various exhibits, the "on" position for each of these institutional conditions is signified by an "H" (historical conditions). The "off" position is signified by a "C" (compact conditions). When transmountain deliveries are excluded, the exhibits show "0" (no deliveries).

Model results are calculated as the difference between a pair of runs. For example, to show the Stateline depletions caused by postcompact pumping, the first run of the model is made on the basis of actual historic conditions, that is, all switches are "on." The second run would have a single change, that is, postcompact pumping would be reduced to the 1948 compact level. The

difference in Stateline flows would represent the depletions caused by the additional postcompact pumping. This example is shown as Comparison "F" on Kan. Exh. 111* (12/6/90). Total depletions from postcompact pumping as shown by this model run, without taking accretions into account, amount to 1,581,000 acre feet for the 1950-85 period. These are depletions of total flow, not usable flow.

Durbin relied upon Comparison "C" of Kan. Exh. 111* (12/6/90) to show the combined effects of postcompact pumping in Colorado and the Winter Water Storage Program. RT Vol. 45 at 81. Under this scenario, total depletions without considering accretions amounted to 1,427,000 acre-feet. After deducting accretions, the net depletions were 1,029,000 acre-feet. In Durbin's view, the issue of whether or not accretions should be taken into account was in part a legal consideration and in part a hydrologic consideration. The hydrologic aspect was that although accretions in a given month could be isolated, they would not necessarily make up for depletions in another month. RT Vol. 44 at 120. The depletions shown on Kan. Exh. 111* (12/6/90) were to total, not to usable, flow.

The original Kansas claim, as confirmed during Durbin's testimony and based on the H-I model, was 917,000 acre-feet. RT Vol. 45 at 124-25. This represented depletions to usable flow over the 1950-85 period resulting from the combined effects of postcompact pumping and the WWSP. Kan. Exh. 112* (12/6/90) Comparison "C"; RT Vol. 45 at 125. This analysis considered that the 1980 Operating Plan for John Martin Reservoir was in effect during both of the comparison runs. In contrast, and

based on the revised version of the H-I model, the present Kansas claim for depletions to usable flow caused by pumping and the WWSP together, comes to 489,000 acre-feet.[77] Kan. Exh. 111***.

C. Colorado's Criticism of the Original Version of the H-I Model.

Kansas complains that Colorado in its opening post-trial brief spent some 150 pages attacking Durbin and the original version of the H-I model. Kansas calls it "largely a waste of the Special Master's time" because substantial revisions were made to the H-I model, and to Durbin's analysis, by the Kansas replacement experts. Perhaps more aptly, Kansas also noted that Colorado's emphasis tended to obscure the fact that its own water budget analysis showed total depletions of approximately 583,000 acre-feet resulting from postcompact pumping.[78]

The major changes in Kansas' position and evidence cannot be ignored. For some five years the Kansas experts worked to accumulate the necessary data and to develop the H-I model in order to support the state's claims. Yet after Colorado's cross-examination during trial uncovered numerous errors and shortcomings in the Kansas

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[77] The comparison with 917,000 acre-feet is not exact because the depletion figure of 489,000 acre-feet assumes that the 1980 Operating Plan was not in effect, either during the historical run or the combined effects run. The comparable figure from the revised H-I model is 496,000 acre-feet (1980 Plan included in both runs). Kan. Exh. 651, comparison 4.

[78] Colo. Exh. 135* at 6.1; RT Vol. 115 at 73-75. These are depletions of total flow, however, not depletions of usable flow.

evidence[79], and after the trial recess caused by Durbin's hospitalization, Kansas' replacement experts testified to substantially different conclusions than those resulting from the original H-I model. Brent E. Spronk, one of Kansas' replacement experts, testified openly that the results of the original H-I model were not reliable.[80] As part of its replacement case, Kansas made numerous changes to the original H-I model, but did not alter its basic logic and structure. RT Vol. 88 at 52. In addition, Kansas submitted 63 revised exhibits and 10 new exhibits. As a result of these changes, Kansas cut its claimed depletions approximately in half. Under Durbin, the Kansas claim was 917,000 acre-feet for both pumping and the WWSP. It is now 489,000 acre-feet. Kan. Opening Br. at 128.

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[79] The errors were not confined to the H-I model. Of some 25 exhibits prepared to support Durbin's statistical analysis, all contained errors. Durbin prepared revised exhibits for 24 of these, but there were also errors in the revised exhibits. RT Vol. 48 at 4-17. Dr. Lefkoff apparently supervised the preparation of these exhibits. RT Vol. 47 at 83, 87.

[80] Spronk said: "I don't believe that those results [of the H-I model] are reliable or accurate in terms of the magnitude of impact that they showed at the state line . . . ." RT Vol. 88 at 93-94; RT Vol. 89 at 103-04. Spronk was one of the experts involved early in the preparation of the Kansas case, but his role then was confined largely to developing raw data, and to work on the operation of Trinidad Reservoir (decided on motion, in Part III of this Report). Spronk holds a 1978 master's degree in civil engineering from Colorado State University, and is president of Spronk Water Engineers. His resumé is Kansas Exhibit 481, and his experience includes an earlier report on the Arkansas River done when he was employed by Simons, Li & Associates. Jt. Exh. 88.

Colorado assigned one of its experts, Dewayne R. Schroeder, solely to the task of reviewing and understanding the H-I model.[81] Schroeder was ultimately able to extract the specific data used in the model as well as the values used for such parameters as canal seepage, tailwater runoff and noncrop consumptive use, each of which was improper in his view. As a result of his analysis, Schroeder also identified 16 separate coding errors and inappropriate assumptions in the original H-I model. RT Vol. 87 at 53-67. There is no need to address them in detail here, except perhaps to note that the coding error with respect to monthly inflow at Pueblo dramatically changed the impacts of the WWSP calculated by the model. RT Vol. 87 at 54, 67. The validity of these criticisms was essentially confirmed by Kansas' replacement experts, who responded to each of them.

However, Schroeder and other Colorado experts testified to additional deficiencies in data and model structure that were not changed in the revised version of the model. These included reliance upon the rainfall-runoff model to estimate ungaged tributary inflow; failure to calibrate the groundwater model to water levels; treatment of the groundwater aquifer as a linear system; unreasonable estimates of deep percolation; failure to divide the river into sufficient reaches; failure to account for precipitation in the logic used to predict Kansas'

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[81] Schroeder is an engineer employed by the Colorado Division of Water Resources. Since 1984 he has been head of the Chief Engineer's Special Studies Unit, concerned primarily with groundwater modeling.

demands for releases from John Martin Reservoir; inaccurate assignment and distribution of pumping and irrigated acreage figures among the various canal companies; and underestimation of water consumption by phreatophytes.

Dr. Devraj Sharma,[82] Colorado's expert in groundwater modeling, was particularly critical of Durbin's efforts to calibrate Kansas' groundwater model. Durbin presented a series of hydrographs to show the match between predicted and observed groundwater levels. Kan. Exhs. 89C, 89D. But Dr. Sharma pointed out that of the 106 hydrographs shown, 30 had been "clipped" so as to appear more favorable than they really were. RT Vol. 81 at 7-23; Colo. Exh. 809. When Sharma plotted actual predicted water levels, instead of merely changes in levels, it appeared that 30% of the wells showed water levels that were either above the surface of the ground, or were below bedrock. Dr. Freeze did not consider such a model to be properly calibrated. RT Vol. 105 at 53-54.

While Kansas' replacement experts made a number of changes to Durbin's groundwater models, they did not recalculate the hydrographs used by Durbin. RT Vol. 100 at 45-47. Larson testified that it would have been a "relatively difficult step to go through," and the hydrographs

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[82] Dr. Sharma's broad experience and qualifications are summarized in Colorado Exhibit 668*. His Ph.D is from London University, and he has been a visiting professor at a number of universities around the world. He has extensive expertise in mathematical modeling, and developed the groundwater models used by Colorado in its water budget analysis. He was with Dames & Moore from 1975 to 1983 and moved to Denver in 1978. Currently, he is president of Principia Mathematica Inc.

were only one of several bases for judging the adequacy of the groundwater component of the revised H-I model. *Id*. Instead, Larson calibrated against winter streamflows, a procedure that Colorado experts thought should have been coupled with comparisons to measured groundwater levels. RT Vol. 105 at 52-53, 59; RT Vol. 106 at 26. Schroeder testified that the H-I model always tended to overpredict diversions, and that its problems "go quite deep." RT Vol. 111 at 62.

The Colorado view that inherent flaws still remain in the H-I model, even after the revisions that have been made, was also shared to some extent by experts for the United States. Their testimony is discussed in Section XXII on the WWSP.

SECTION XIX

KANSAS' REPLACEMENT CASE

Following the continuance occasioned by Mr. Durbin's illness, Kansas resumed its case in chief. A "replacement case" was presented through five "replacement experts." Three members of the replacement team had testified earlier (Spronk, Book, Lefkoff), but they now played expanded rolls. The two other replacement experts were Steven P. Larson and Thomas A. Prickett. In addition to making numerous corrections and revisions to the H-I model, Kansas lodged 63 revised exhibits and ten new exhibits. Included were revisions to Durbin's statistical and water budget analyses. Some of the lodged exhibits reflected necessary corrections, but other model changes and revised exhibits actually represented an effort to improve Kansas' case, responding to matters that had been raised on cross-examination.

Colorado moved to exclude a number of the lodged exhibits and to require that portions of the replacement case be presented only in rebuttal. Colorado argued that Kansas had taken advantage of the continuance "to redo parts of its case," and that was not the purpose of the continuance. RT Vol. 88 at 29-30. To be sure, there was some merit in Colorado's reaction, but in the last analysis I concluded that it was more important to have the best evidence available in the record. Colorado's motion was denied. Any prejudice to Colorado was sought to be remedied by giving Colorado whatever time was necessary to prepare proper cross-examination and to respond as part of its surrebuttal case.

The chief replacement witness was Steven P. Larson. He holds a 1971 Master of Science degree in civil engineering from the University of Minnesota. From 1971 to 1980 he was employed by the USGS and had extensive experience there in the research and development of models, principally groundwater models. In 1980 he joined the consulting firm of S. S. Papadopulos & Assoc. as a vice-president. That is his present employment. As a member of that firm he has had considerable experience in major litigation involving the interaction between groundwater and streamflows on the Pecos and Rio Grande Rivers. He has also done work for the Colorado state engineer.[83]

When Kansas engaged the Papadopulos firm to assist in this case, Durbin essentially acted as the project manager. RT Vol. 98 at 84-85. Larson was involved only as an advisor to Durbin and as a reviewer. After Durbin left the Papadopulos firm in 1989, Larson continued to act as an advisor, but on a relatively limited basis. *Id.* at 85.[84]

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[83] His full qualifications appear in Kan. Exh. 488.

[84] As a member of the team of replacement experts, Larson was asked to review the statistical and water budget exhibits presented by Durbin; to assist in the review and revision of the H-I model; and to draw conclusions as to whether and to what extent streamflows had been depleted by postcompact pumping in Colorado and by operation of the Winter Water Storage Program. RT Vol. 98 at 86.

A. Review of the Statistical and Water Budget Analyses.

Kansas' replacement case included revisions to its statistical and water budget analyses, as well as to the H-I model.[85] The revised exhibits presenting the results of the statistical and water budget analyses corrected numerous errors that had been identified in earlier versions of the exhibits, and contained slightly different time periods for comparison. The exhibits continued, however, to present data comparisons of precompact and postcompact conditions, and early and late postcompact years. The revised exhibits continued the use of statistical plots, the use of regression analyses, and in part the use of a parallel line model. Larson testified that these revised exhibits supported the general conclusions reached earlier by Durbin, namely:

1. Stateline flows were lower in the postcompact period than in the precompact period for any equivalent amount of annual basin inflow. RT Vol. 98 at 89.

2. Stateline flows at any particular level of basin inflows were lower in the late postcompact period than in the early postcompact period. RT Vol. 98 at 100.

3. There is a trend of decreasing Stateline flows associated with increased amounts of pumping. RT Vol. 98 at 101.

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[85] See especially Kan. Exhs. 59**, 60**, 61**, 63**, 70**, 99D**, 99F*, 99G**, 100D**.

4. There is a tendency for pumping to increase as basin inflows decrease, that is, as less surface water is available for diversion. RT Vol. 98 at 106, 109.

5. "Consumption" in Colorado increased in the late postcompact period relative to the early postcompact years.[86] RT Vol. 98 at 117, 125-26.

Larson acknowledged, however, as had Durbin, that the various statistical plots did not explain the causes for the differences shown. This was the reason that it was necessary to move into modeling. RT Vol. 98 at 90; RT Vol. 100 at 19; RT Vol. 127 at 135. Nonetheless, factors identified by Larson that might account for the statistical differences included the operation of John Martin Reservoir, pumping in Colorado, the Winter Water Storage Program, and the increased water use by phreatophytes.

In connection with the water budgets, it should be noted that ungaged tributary inflow was based upon the runoff predicted by Kansas' rainfall-runoff model, and the consumptive use by phreatophytes reflected the earlier testimony by Kansas' expert. Both of these items are disputed by Colorado. Overall, Larson relied upon the statistical and water budget analyses to provide "sort of first-order estimates," and used them mostly "to look at trends in the relationships between the variables." RT Vol. 100 at 17-19, 50-51. However, he also testified that the

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[86] "Consumption" was simply the residual in the water budgets and included many conditions in addition to consumptive use by crops. RT Vol. 98 at 115.

depletions shown by the H-I model corresponded generally with the quantities in the water budgets. RT Vol. 99 at 92-96.

B. Revisions to the H-I Model.

Significant changes were made in the H-I model. RT Vol. 100 at 47; RT Vol. 110 at 104. Some 900 lines were added to the model code. Kan. Exh. 639; Colo. Exh. 765. An eight-page list describes 53 changes to the model code. Kan. Exh. 640. Another list shows the data files that have been changed. Kan. Exh. 641. Schroeder acknowledged that the sixteen coding errors and inappropriate assumptions previously identified had generally been corrected. RT Vol. 110 at 107-117. He testified that there were no coding errors in the revised model. RT Vol. 139 at 117.

However, many other changes were also made. Principally, the replacement experts no longer used the special version of the original H-I model to estimate monthly tributary inflow, but rather inserted the annual values predicted by the rainfall-runoff model as direct input into the revised H-I model. RT Vol. 89 at 128; RT Vol. 96 at 43. In connection with the groundwater models, the replacement experts did not calibrate against changes in ground water levels as Durbin had done, but rather used winter streamflows for their calibration. RT Vol. 100 at 45-47. Larson testified that they did not go back and recalculate the clipped hydrographs because of the relative difficulty of that step, and because "it was only one of several bases for judging the adequacy of the ground water component of the [H-I] model." RT Vol. 100 at 47. He said that the

groundwater models should be viewed as part of the H-I system, not as separate units, and that evaluating the overall results of the H-I model included an evaluation of groundwater conditions and the response functions derived from the groundwater models. RT Vol. 99 at 76-77.

Initially, the replacement team was not able to calibrate the H-I model as it had been corrected and revised. RT Vol. 88 at 79; RT Vol. 95 at 139. Predicted diversions under the historic simulation of the model were much higher than the observed data. Calibration was achieved only through the insertion of two "calibration factors," namely, a diversion reduction factor and a canal capacity reduction factor. Both of these factors restricted model diversions by certain water-short ditches.

The diversion reduction factor was applied seasonally to the Amity and Colorado Canals, to the Fort Lyon junior rights, and to the Great Plains reservoir system. RT Vol. 88 at 78. This calibration factor reduced diversion amounts between 15 and 25 percent when applicable. RT Vol. 88 at 82. In addition, the canal capacity reduction factor artificially reduced, for model purposes, the capacities of a number of major canals below their known actual physical capacities. Colo. Exhs. 695 and 903. The effect of both these factors was to limit diversions by certain canals at certain times even though water was available in the river, even though the canals had both the rights and physical capacities to divert, and even though the need for water was apparent. Moreover, water thus required by the model to pass downstream was routed directly into the conservation pool at John Martin Reservoir or down to the Stateline, and was

treated as being unavailable for use by any intervening diverter. RT Vol. 111 at 55. Dr. Lefkoff testified that this constraint was necessary in order to achieve calibration. RT Vol. 95 at 139. Larson and Spronk testified to the same effect. RT Vol. 127 at 52-57; RT Vol. 128 at 38-42; RT Vol. 88 at 79.

Schroeder acknowledged that the H-I model, as revised, was calibrated. RT Vol. 138 at 98. However, he objected strenuously to the way in which calibration had been accomplished. Use of the diversion and canal capacity reduction factors, in his opinion, were inappropriate because they did not "represent any physical process."[87] RT Vol. 111 at 52. He testified that model results are not necessarily reliable simply because the model has been calibrated, that is, simply because predicted and observed values match reasonably well. RT Vol. 138 at 100. Dr. Freeze agreed that a model can appear calibrated but still be in error because of paired parameters, both of which are in error. RT Vol. 70 at 136.

Kansas experts, however, defended the use of these calibration factors as appropriate modeling techniques. RT Vol. 127 at 52 *et seq*. Larson testified that the use of calibration parameters in all forms of modeling analyses is common practice. *Id*. They are designed to improve a model's performance and often are required to compensate for lack of basic data. They need not be physically based. *Id*. at 53. Larson noted that the Colorado water budget employs such a parameter called "maximum farm

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[87] Helton testified that the application of the diversion reduction factor was the "most important deficiency" in the revised H-I model. RT Vol. 115 at 45.

efficiency." *Id.* at 54. It is not physically based, but operates at times to constrain consumptive use. *Id.* at 54-55. According to Larson, calibration is not simply a mechanical process, but must include "the judgment and experience of the analyst . . . in order to get reasonable results." RT Vol. 98 at 134.[88]

C. Calibration Results of Revised H-I Model.

In evaluating the performance of the revised H-I model, the Kansas experts focused on matching predicted and observed streamflows and diversions because that is what the model was designed to determine. Larson illustrated the model's calibration mainly through two exhibits: Kan. Exh. 566G*-566L* and Kan. Exh. 568*. The first of these exhibits includes a series of charts or line diagrams illustrating the comparison between model calculations of streamflows and actual observed flows at a number of different points along the Arkansas River. Larson testified that the revised model was able to replicate streamflow conditions reasonably well. RT Vol. 99 at

[88] Larson also pointed to a number of USGS modeling studies along the Arkansas River that generally support the approach used by Kansas. Included are studies that combine surface and groundwater models, that treat the system as linear for modeling purposes, that use unit response functions to simulate the interaction between groundwater and surface flows, that predict diversions, and that are calibrated against streamflows. Jt. Exhs. 74, 75, 76, 77, 78; Kan. Exhs. 441, 442, 668, 687. All of these approaches or assumptions, when employed by Kansas in the H-I model, invoked criticism from Colorado experts.

81-88.[89] While the scale of these charts is quite small, the correspondence between predicted and measured flows seems reasonable. However, Helton produced tables of numerical amounts of flow that put in question the model's performance at points upstream from the Stateline. Colo. Exhs. 908, 996. These are discussed later.

Larson also testified with respect to Kansas Exhibit 568*, which is a line chart and scatter diagram illustrating the correspondence between observed and predicted diversions. He thought that the revised model did a "very good job" of simulating total diversions in the Arkansas Valley in Colorado, despite the criticisms about the use of diversion reduction factors. RT Vol. 99 at 90.

Based upon these exhibits, together with Kansas Exhibits 570* and 571*,[90] Larson testified that the revised H-I model was sufficiently calibrated to make comparative runs between historical or baseline conditions and alternative institutional conditions.[91] RT Vol. 99 at 92.

[89] His characterizations ranged from "quite well" upstream, to "reasonably well" at midstream, and to "reasonably good" at the Stateline.

[90] These exhibits divided total diversions into upstream and downstream comparisons.

[91] Dr. Sharma, Colorado's expert in groundwater modeling, testified that a model should not only be calibrated but also "verified." This process involves holding back certain historical data from the calibration process, calibrating the model using only the remaining data, and then comparing predicted model results with the withheld historical data. Larson termed this procedure a luxury, "very rarely done in practice." RT Vol. 98 at 139. He testified that this case presents a very complicated problem where we have to use "all of the data we can get our

Larson was unwilling to agree that calibration determined whether or not a model was "accurate" or could be "reliably used." He defined calibration as "trying to obtain the best estimates of the parameters, so when we used the model, we get the best estimate of the results." RT Vol. 98 at 140; RT Vol. 128 at 68-69. It was his opinion that "we have obtained the best parameter set that we can given the information we have available to us. So as a result, the calculations of the model will represent my best estimate of conditions along the Arkansas River Valley with respect to this particular model. And then when we use it to calculate conditions for an alternative scenario, that would represent my best estimate of what that scenario would be." RT Vol. 98 at 140. Spronk also testified that the model results provide the best estimates of depletions.[92] RT Vol. 88 at 118.

Larson recognized the presence of uncertainty in the revised H-I model results. RT Vol. 99 at 29. But he testified that when two model results are subtracted one from the other in order to get the difference, the uncertainty associated with the difference will not necessarily be as great as the uncertainty in each of the individual model runs. *Id.* The reason is that many of the approximations used in the model are the same in both model runs. If there is error in these data, Larson testified that such

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hands on to do the calibration." RT Vol. 99 at 80. Dr. Freeze had not examined either the Kansas or Colorado models, but he said that verification is "good practice." RT Vol. 70 at 139.

[92] Dr. Freeze agreed there is no "right answer" from a calibrated model, only a best estimate of the right answer given the data you have and the methods used. There is "a range of answers," he said. RT Vol. 70 at 146.

correlated errors "will tend to cancel out." RT Vol. 99 at 30. He termed this "canceling effect" an important factor in considering how the revised H-I model is used in this case.[93] *Id.* The situation would have been different, he pointed out, if Kansas had tried to compare the alternative institutional condition not with another model run, but rather with actual measured historical data. *Id.* The United States expert, Charles W. Binder, agreed that the parallel run theory and the consequent cancellation of error is a "common method that is used in modeling." RT Vol. 118 at 100. However, for reasons discussed in Section XXII, he did not believe it applied in the analysis of the Winter Water Storage Program. *Id.* at 101.

Both Colorado and the United States introduced evidence comparing actual observed Stateline flows with those predicted by the revised H-I model when operated in its historic mode (HHHH, i.e., all institutional switches "on"). Colorado Exhibit 908 shows that for the 1950-85 period actual observed Stateline flows totaled 5,186,496 acre-feet. For the same period of time, the H-I model predicted a total of 4,646,992 acre-feet. Thus, the revised

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[93] Dr. Young Yoon, one of Colorado's expert witnesses, developed a model to isolate the possible impacts of stock ponds and soil conservation measures within the Purgatoire River watershed. His results were derived from a comparison of two model runs, not from a comparison with actual measured flows. RT Vol. 101 at 19-20. In this way, he testified, whatever error might exist in the models would be the same, and any such errors would "cancel out" when you take the difference between the two runs. *Id.* at 22, 25. He added, however, that whether errors cancel depends upon how a model is applied. *Id.* at 76.

H-I model underpredicted total Stateline flows by a little more than ten percent.

The United States prepared similar exhibits, but excluded the extraordinary high flood flows in certain "outlier" months. The months excluded were May and June of 1951 and June, July, August and September of 1965. Excluding these outliers, the United States exhibits show a close correspondence between observed and predicted H-I model flows. For the compact years of 1951-85 actual Stateline flows averaged 119,954.9 acre-feet annually. U.S. Exh. 24*. For the same period of time, the H-I model predicted an annual average of 121,973.3 acre-feet annually. U.S. Exh. 25*. Thus, over the full 1951-85 period, the difference between actual and predicted annual average flows amounted to only 2018.5 acre-feet. U.S. Exh. 26*. The United States exhibits also show that the years in which the model underpredicted are about equal in number to those in which it overpredicted. Moreover, the largest annual underprediction is on the same order of magnitude as the largest overprediction. U.S. Exh. 26*.

Colorado argues, however, that it is not enough for the H-I model to match Stateline flows; that it should also perform well throughout the length of the river. Helton testified to what he called "imbalances" upstream. RT Vol. 133 at 95. Colorado Exhibit 996, which excludes the outlier months of May 1951 and June 1965, shows that the revised H-I model underpredicts streamflows at La Junta by 17 percent; then closely matches observed flows at Las Animas, which is just upstream from John Martin Reservoir; then overpredicts the outflow from John Martin by 7 percent; and farther downstream at Lamar overpredicts

by 50 percent. Finally, the model comes back into almost perfect correlation at the Stateline. Helton testified that these imbalances indicate errors in the model, either in the input data, in the assumptions, or in the calibration parameters.[94] RT Vol. 133 at 93-95.

Expert witnesses for the United States generally supported the Colorado criticisms of the H-I model. Their testimony is discussed in Section XXII.

In the final analysis, however, Helton conceded that the revised H-I model does provide a "rough idea" of the impacts of well pumping:

> "With respect to well pumpage, your Honor, I believe the H-I model does give a rough idea of impacts from well pumpage. But I think that rough idea is valid only on a long-term average." RT Vol. 115 at 51.

An anomaly in the case is that the Colorado water budget analysis actually shows greater depletions from pumping than the revised version of the H-I model. Kansas made one run of the H-I model using Colorado's figures for postcompact pumping, which are almost two million acre-feet less than the estimates on which Kansas bases its claim. The results of that run showed total Stateline depletions of 395,000 acre-feet for the 1950-85 period. Kan. Exhs. 642, 643, 742. This total compares to Colorado's estimate of almost 583,000 acre-feet of depletions for the same amount of pumping.

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[94] Helton outlined the errors claimed in some detail. RT Vol. 133 at 102-115.

Colorado does not dispute the comparison.[95] Rather, it tries to blunt the impact by arguing that the causes of the depletions and the conclusions to be drawn from the Colorado analysis are very different. I cannot see that the causes are different. Both studies show the impact on Stateline flows caused by postcompact pumping only, and the amount of that pumping is the same in both of the analyses.

As to the conclusions to be drawn from the Colorado evidence, Colorado points to the opinions of its experts that depletions from pumping upstream of John Martin Reservoir were largely offset by return flows from transmountain imports, and that downstream of John Martin depletions were either absorbed by the Colorado ditches or effectively offset by benefits from the 1980 Operating Plan. These conclusions raise possible defenses now, and later may be important in any remedies phase of this case. However, Kansas' point is that the revised H-I model, despite the pounding it has received, produces more conservative results than Colorado's own evidence. Colorado's "conclusions" deal with possible offsets, but do not alter the amount of depletions at the Stateline. Kansas' argument appears well taken, even though it goes too far in claiming that criticisms of the H-I model are thus made "irrelevant." Kan. Answer Br. at 22.

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[95] In its post-trial briefs Colorado acknowledges "that the Colorado analysis shows higher depletions than the results calculated by the H-I Model, as revised [by] the Kansas replacement experts." Colo. Response Br. at 77, 93-94.

D. Results of Revised H-I Model.

The results of the revised H-I model are shown on Kansas Exhibit 111*** and 565***. The latter exhibit provides monthly data which are summarized in Kan. Exh. 111***. A copy of Kansas Exhibit 111*** is included in the Appendix as Exhibit 11.

The depletions shown in Kansas Exhibit 111*** represent total depletions of Stateline flows over the period 1950 to 1985.[96] Moreover, they are depletions of usable flows. What constitutes "usable" flow was determined on the basis of an analysis prepared by Spronk Water Engineers ("SWE" or "Spronk") and presented as part of Kansas' replacement case. RT Vol. 100 at 12 *et seq*. The methodology used by SWE is different from that originally employed by Durbin and results in larger depletions. This issue is fully discussed in Section XXI. The depletions of usable flows do not include any accretions. This issue is also taken up later.

The revised H-I model calculates depletions to usable Stateline flows of 620,000 acre-feet resulting from postcompact pumping in Colorado. This figure does not take into account any offsets resulting from the return flows from transmountain imports. RT Vol. 89 at 76. If such offsets are considered, depletions to usable flows from

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[96] Kansas Exhibit 111*** also includes an estimate of increased depletions caused by "future pumping." This calculation is disregarded here. It assumes a continuation of pumping without regard to appropriate remedies if liability is confirmed. RT Vol. 89 at 72-74.

pumping are reduced to 464,000 acre-feet. Kan. Exh. 651; RT Vol. 90 at 8.

The model shows that depletions from the Winter Water Storage Program considered by itself amount to 40,000 acre-feet. This amount does not reflect any offset for transmountain water. RT Vol. 89 at 76.

The "combined effects" condition tabulated on Kansas Exhibit 111*** represents the depletions caused by both postcompact pumping and the WWSP. Kansas experts determined that it was necessary to analyze the effects of these two changes together because of the potential for interaction between them. Kan. Opening Br. at 101. The combined effect of the two institutional changes proved to be less than the sum of the two analyzed separately. *Id.*; RT Vol. 100 at 21. In addition, this analysis includes an offset for transmountain return flows. RT Vol. 89 at 72. The net amount of depletions of usable Stateline flows under these conditions is determined by Kansas to be 489,000 acre-feet.[97] This appears to be the amount of the Kansas claim,[98] although Kansas has indicated that the appropriateness of any offset due to return flows from transmountain deliveries should be reserved to the remedies phase of the trial. Kan. Letter of 9-3-93 at 10. Moreover, Kansas states that

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[97] If the determination of usable flow is based upon the methodology employed by Durbin, as modified by Larson, depletions from the combined effects of pumping and the WWSP are reduced to 365,400 acre-feet. Colo. Exh. 975; Kan. Exh. 560**; RT Vol. 100 at 11, 15; RT Vol. 99 at 126-42.

[98] See Kan. Opening Br. at 115, 128. This amount is the only finding of depletions of usable flows that Kansas has requested.

the "actual violation" of the compact from pumping is 620,000 acre-feet, that is, the total depletions without acknowledging any offset from transmountain return flows. Kan. Letter of 8-24-93 at 5.

The compact does not cover transmountain imports, and Kansas has acknowledged that it makes no claim to such water. However, the return flows from such imports do add to the Arkansas River supply and do act to offset depletions caused by use in Colorado. We have no assurance that such imports will always continue, nor that the return flows therefrom will remain the same. Yet to the extent that return flows from transmountain imports have actually provided an offset to depletions in the postcompact years, I believe that such evidence is not only relevant now, but is also required.[99]

Kansas did not offer any direct evidence apportioning the 489,000 acre-feet of depletions as combined impact between groundwater pumping and the WWSP.

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[99] I agree with the position taken by the United States in its September 3, 1993 letter:

> "Our understanding of the common sense meaning of Article IV(D) of the Compact is that it prohibits 'actual' rather than hypothetical depletions. Under this common sense meaning, new development will not violate the Compact, even if it has the isolated potential of reducing stateline flows, so long as any potential depletions are offset or compensated for at the stateline by additional water from other new development or other sources such as transmountain return flows. In other words, there is no Compact violation, and no liability, unless the combined effect of all operations, including new development, results in a material depletion of usable flow."

Indeed, Kansas has indicated that there may not be a way to apportion the combined impact. Letter of 8-24-93 at 5.

E. Use of the 1980 Operating Plan in the Revised H-I Model Runs.

In calculating the revised model results for postcompact pumping alone, Kansas included operations under the 1980 Operating Plan in both runs. Kan. Exh. 111***. But in analyzing the combined effects of pumping and the WWSP, as well as the WWSP by itself, the 1980 Operating Plan was excluded. That is, in both the baseline runs and in the "what if" scenarios, Kansas assumed that the 1980 Operating Plan had not been adopted. *Id.* These exclusions are directly contrary to the assumptions made in Kansas' earlier presentation. Durbin testified to the final Kansas claim based upon the results shown in Kansas Exhibit 112* (12-6-90). (See statement by counsel in RT Vol. 45 at 125.) Comparison "C" of that exhibit represents the combined effects of pumping and the WWSP, and shows depletions of 917,000 acre-feet. Comparison "H" shows the impact of the WWSP alone. Both of these runs in Kansas Exhibit 112* (12-6-90) were based upon the operation of the 1980 plan.

I find no evidence in the record explaining the switch change insofar as the combined effects analysis is concerned, although Mr. Spronk discusses the change for the WWSP alone. RT Vol. 88 at 133-35. It is not clear that Colorado opposes the change, but Colorado does point out that the revised assumptions are inconsistent with Kansas' statement of entitlement. Counsel for Kansas wrote:

> "With respect to releases during the period from 1980 to the present, Kansas claims that it was entitled to the releases that would have been made to Kansas *in accordance with the 1980 Operating Plan* absent the depletions above John Martin Reservoir caused by post-Compact well pumping and the Winter Water Program in Colorado." Kan. Letter of 8-24-93 at 3, emphasis added.

This position does not appear consistent with the revised evidence Kansas relied upon to quantify its claim.

With respect to the change made in the WWSP runs, Spronk attempted to provide an explanation. He said that the 1980 Operating Plan would not exist without the WWSP; that the storage in John Martin Reservoir was a result of the WWSP. RT Vol. 88 at 133-35; Kan. Opening Br. at 96. He then reasoned that if the WWSP were not being operated, the 1980 plan also had to be removed from the "what-if" run. And in order not to have two variables in the comparison, it then had to be excluded also from the historical run. The United States draws the opposite conclusion from the fact that the WWSP is "inextricably tied to the 1980 Operating Agreement and helps to make extra water available to Kansas." U.S. Letter of 9-3-93 at 1. It states:

> "We don't see how Kansas can accept a portion of the WWSP water stored under the 1980 Agreement and at the same time demand the same schedule of inflows that would have occurred had the WWSP not been implemented." *Id.*

As the United States properly notes, the Kansas WWSP analysis relies upon a comparison of two hypothetical

model runs, neither of which actually happened. U.S. Response Br. at 13-14.

Kansas agrees that the existence of the 1980 Operating Plan should be considered in determining the historical conditions to which the revised H-I model is calibrated. RT Vol. 89 at 80. But Kansas argues that the benefits of the 1980 plan were "separately bargained for," and should not be applied to offset the detriments which arise from a compact violation. *Id.* at 80-81. I agree that the benefits of the 1980 plan, as Helton has quantified them or otherwise, may not be used as a defense to the impact of wells drilled downstream of the Buffalo Canal headgate after 1965. Colo. Exh. 1011, Comparison 9; RT Vol. 133 at 68-75. That was not the intent of the resolution approving the 1980 Operating Plan. However, it does not follow, as a modeling technique, that the 1980 plan must be ignored. The plan now affects results for only five years, but looking to the future, it would become increasingly difficult and less reliable to analyze river conditions on the basis of a storage and release pattern that would not actually have existed over an ever growing number of years.[100]

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[100] It is somewhat anomalous, considering the views of the parties, that the actual inclusion of the 1980 Operating Plan in both of the combined effects runs serves to increase the depletions of usable flow calculated by the revised H-I model from 489,000 acre-feet to 496,000 acre-feet. Kan. Exh. 651, Comparison 4. However, when the WWSP is analyzed separately with the 1980 plan in place, accretions have a major impact. The model results show an increase in Stateline flows of 57,000 acre-feet over the 1976-85 period. *Id.*, comparison 3. There was no evidence, however, on the usability of the accretions.

F. Consideration of Accretions.

The concept of accretions to flows in the Arkansas River was introduced by Kansas. This concept recognizes that releases from upstream storage reservoirs, and pumping from groundwater storage, may at times enhance river flows.[101] This is apart from the fact that the overall impact of groundwater pumping or surface storage may deplete Stateline flows. Kansas exhibits showing the results of both the original and the revised H-I model include depletions alone, and also depletions less accretions. E.g., Kan. Exhs. 111* (12-6-90) and 111***. (Under some model runs, accretions exceed depletions and this result is indicated by parentheses or a minus sign.) Both Durbin and Spronk testified, however, that accretions are relatively infrequent. RT Vol. 45 at 74; RT Vol. 89 at 67; Kan. Exh. 565***. The Kansas replacement case exhibits show depletions not only of total Stateline flows but also of usable flows. Depletions of usable flow, however, do not reflect usable accretions if indeed any exist. RT Vol. 89 at 15, 67; RT Vol. 138 at 75-76. This is in spite of the fact that the revised H-I model does offset daily accretions against daily depletions within the same month.

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[101] Larson defined accretions as follows:

> "An accretion is a situation where the state line flow in the alternate condition – that is, the alternate institutional condition – is higher than the state line flow in the original condition. So there is an increase in the state line flow as a result of this for that particular month, rather than a decrease which would be a depletion." RT Vol. 125 at 6.

Kansas properly seeks protection against an averaging process that would allow depletions to be offset by later accretions that might not be usable because of amount or timing, or might simply come too late to compensate for earlier injury. Article IV-D of the compact addresses not only quantity but also protects the "availability for use" of Stateline flows. But this is not to say that accretions should always be disregarded. In its Reply Brief at 81, Kansas takes the view that it would be inconsistent with Article IV-D to offset accretions because the compact prohibits depletions only. I do not agree with that interpretation of the compact. The compact was never meant to regulate the myriad of activities in Colorado that can both add to or subtract from the water in the Arkansas River, except to require that the net result of such development will not materially reduce the usable flow at the Stateline.

Whether accretions may appropriately be considered as an offset to depletions requires an analysis of each particular situation. RT Vol. 113 at 15-17. However, there was little effort by the parties to see if any individual accretions were in fact usable and could properly reduce depletions. In part, this may have been due to the fact that the impact from pumping was not much different whether depletions alone were considered, or depletions less accretions. Colo. Exh. 1012; RT Vol. 138 at 80. The Colorado water budget analysis showed only small accretions due to pumping. Kan. Exh. 643.

Accretions produced by the revised H-I model result primarily from the logic used in reservoir operations. RT Vol. 111 at 149; RT Vol. 138 at 73, 78. The timing of both depletions and accretions is an artifact of the modeling

process,[102] and is not likely to be exactly replicated in actual operations. For this reason alone, it may be extremely difficult to determine whether accretions calculated by a model should be used to reduce depletions. However, that issue needs to be examined.

G. Conclusions.

Based upon all of the evidence in the case, including the Colorado water budget analysis discussed in Section XX, and regardless of which burden of proof applies, I have no difficulty in concluding that postcompact pumping in Colorado has caused material depletions of the usable Stateline flows of the Arkansas River, in violation of the Arkansas River Compact. The total amount of such depletions over the 1950-85 period is much more difficult to determine. If my conclusion on liability is confirmed by the Supreme Court, then, to refine the total amount of depletions, additional evidence will be required during the remedies phase of the trial.

This conclusion relates only to postcompact pumping in Colorado, and not to the Winter Water Storage Program. The impact, if any, of that program is discussed in Section XXII hereof.

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[102] Releases from John Martin Reservoir, for example, are in part dependent upon the numbers used in the model to simulate monthly demand by Kansas. These numbers reflect some averaging and calibration techniques, and do not vary in the short term with weather or crop conditions. RT Vol. 111 at 23-39, 145-47; RT Vol. 112 at 49-50; RT Vol. 138 at 73-74, 78.

SECTION XX

COLORADO WATER BUDGET ANALYSIS

Counsel for Colorado described its water budget analysis as being at once "both simpler and more complex than the hydrologic-institutional model." RT Vol. 59 at 27. While Colorado generally referred to its approach as a water budget, it actually embraces four integrated models. It involves an analysis of the river system in two separate reaches. The portion between Pueblo and John Martin Reservoir was identified as Reach 3, while the downstream area between John Martin Reservoir and the Stateline comprised Reach 4. For each of these reaches, Colorado developed a separate groundwater model and a water budget model. The data used in Colorado's water budget, and the results, are found in Colorado Exhibit 4*.

Overall, Helton testified that "there has been some impact on state line flows as a result of post-compact pumping." RT Vol. 115 at 62. Above John Martin Reservoir, the impacts in his opinion have been largely offset by the return flows from transmountain imports. *Id.* Below John Martin Reservoir, Helton believes that the impacts have resulted largely from wells constructed downstream of the Buffalo Canal headgate. *Id.*

The groundwater models were used to estimate return flows and the effects of groundwater pumping. Groundwater withdrawals and recharge to the groundwater system were estimated using the water budgets, and that information was passed to the groundwater models. The groundwater models then calculated stream-aquifer interactions, drain flows and changes in groundwater storage. These data were then passed back to the

water budget models to calculate ungaged tributary inflows.

The Colorado water budget analysis cannot be directly compared with the results of the revised H-I model. RT Vol. 127 at 115-16. Colorado does not predict streamflows and diversions as Kansas does. Instead, the Colorado process starts with actual historical diversions, and then estimates the increase or decrease in streamflow that would have occurred under different hydrological or institutional conditions. The river gains or losses are then allocated according to historic demands and rights. The unknown in the Colorado analysis, that is, the residual for which the process solves, is the amount of ungaged tributary inflow. RT Vol. 101 at 33, 43.

The groundwater models are calibrated against well levels, but since the process does not produce predicted streamflows, the final results cannot be compared against measured flow of the river or the output of the revised H-I model. RT Vol. 127 at 70. Nonetheless, Larson did not believe that the differences between the Colorado and Kansas approaches were necessarily significant. RT Vol. 99 at 60-61.

From the outset, Colorado emphasized the need for a more complete and accurate data base for use in the modeling effort. Colorado Attorney General Gale C. Norton, in her opening statement, outlined the data deficiencies and the state's determination to obtain the best and most accurate data possible.[103] RT Vol. 59 at 9. She

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[103] Larson also testified to the lack of historical data, namely, pumping records, the distribution of pumping,

pointed out that the state government had a responsibility to all Colorado water users, some of whom were also being injured if the allegations of Kansas were correct. *Id.* at 10. In order to obtain an adequate scientific basis for decisions, she said: "We chose to place our resources in an effort to develop the best data that we could." *Id.* at 10.

Colorado did, indeed, spend much effort in collecting new data, and verifying and sometimes correcting old data. Much of this work is discussed in the testimony of Hal Simpson, then the Deputy State Engineer, Division of Water Resources.[104] RT Vols. 67, 68. The basic data collection effort included aerial photos and field studies to determine irrigated acreage; a field inventory of wells; reviewing and revising diversion data; tabulating water rights; locating ditch laterals and drains on maps; and making certain flow measurements. Toward the end of the trial, Colorado produced a number of useful exhibits comparing the data sets used by Colorado in its water budget analysis and the data used by Kansas in the revised H-I model.

A. Common Data.

Helton was the expert who testified to this series of comparative data exhibits. RT Vol. 113 at 100 *et seq.*; RT Vol. 114. In his opinion, the differences between the states

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ungaged tributary inflow, off-stream reservoir storage, winter consumption and evaporation, and use by phreatophytes. RT Vol. 127 at 63-65.

[104] Mr. Simpson is now the Colorado State Engineer.

were not significant with respect to the following data sets: upstream inflow, Colo. Exh. 831; transmountain deliveries, Colo. Exh. 846;[105] winter storage accruals in Pueblo Reservoir, Colo. Exh. 847; winter storage releases from Pueblo Reservoir, Colo. Exh. 848; rainfall comparisons, Colo. Exh. 855; assignment of climatic stations for rainfall and evapotranspiration ("ET"), Colo. Exhs. 856, 857; crop data, Colo. Exh. 859; and crop water requirements, Colo. Exh. 860.

B. Significant Differences in the Data Sets Employed by the Two States.

According to Helton there were significant differences in the data sets used by the two states in other areas: precompact pumping allowance, Colo. Exh. 993; total pumping, Colo. Exhs. 822, 852; ungaged tributary inflow, Colo. Exh. 837; certain annual diversions, Colo. Exhs. 838, 839; crop consumptive use, Colo. Exh. 862; and consumptive use by phreatophytes, Colo. Exh. 864.

My analysis of the pumping data appears in Sections XV and XVI and is not further discussed here. Some of the data disputes over the Winter Water Storage Program are also included elsewhere in Section XXII. Other basic data issues, however, are covered in the subsections that follow. Kansas' experts were of the view that for purposes of modeling Stateline depletions, the important

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[105] For the 1950-85 period, the revised H-I model used a total of 2,176,006 acre-feet of total transmountain imports. Colorado's slightly revised total was 2,023,576 acre-feet. RT Vol. 114 at 7-13.

differences in data relate to pumping and to ungaged tributary inflow. RT Vol. 99 at 118-19.

C. Irrigated Acreage in Colorado.

Both states calculated irrigated acreage from aerial photographs. Colorado relied on ASCS[106] photos from 1947, 1953-54, 1962-64 and 1970, and on 1985 photos taken on a special flight arranged by the Colorado state engineer. Colorado assumed linear trends between the various sets of photos, and results were also compared with a 1939 study by the Colorado Water Conservation Board. Moreover, Colorado conducted a land use study in 1985 to provide "ground truth" for the interpretation of the aerial photos. RT Vol. 59 at 19.

Kansas based its calculations on two ASCS sets of aerial photos, using 1957 photos for the 1950-69 period, and 1980 photos for 1970-85. It had little practical access for making detailed field studies. Nonetheless, the Colorado and Kansas figures for average irrigated acreage in Colorado over the 1950-85 period are remarkably close. Colo. Exhs. 827, 828, 829, 830. The amount was approximately 319,000 acres, which compares to a total of approximately 317,000 acres at the time the compact was made. Colo. Exhs. 829, 830.

Colorado argues, however, that Kansas did not make the same detailed analysis which Colorado had made in locating the amount of acreage served by each canal

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[106] Agricultural Stabilization and Conservation Service.

system. As a result, Colorado claims there were inaccuracies in the amounts of irrigated acreage assigned to individual ditch systems used in the H-I model. RT Vol. 113 at 101-110. Colorado attributes part of the H-I model's problems to this allocation, and to the assumption that greater accuracy was not required in determining where water was used because the river basin could be modeled as a linear system.

Both states show a small decline in total irrigated acreage when comparing 1950 with 1985. For Kansas, the reduction is a little over 3,000 acres. For Colorado, the amount is about 14,000 acres, most of which reflects a sharp decline between the 1980 ASCS photo results and Colorado's own 1985 flight results. Colorado says the reduction is due primarily to the conversion of certain irrigation water rights to municipal use. Colo. Closing Well Br. at 17-18. The municipal use of Arkansas River water is relatively small, and was not an issue in this case. However, aside from any change from irrigation to municipal use, a reduction in irrigated acreage does not necessarily mean a reduction in the use of water. The system is water short. Agriculture in Colorado needs more water than the river generally provides. Pumping has partially met that need and has increased the overall use of water in Colorado. Comparing early postcompact years (1950-65) with the later period (1966-85), total supply has increased in Reach 3 from 3.21 acre-feet per acre to 3.69 acre-feet. And in Reach 4, the increase has gone from 2.15 to 2.58 acre-feet per acre. Computed from Colo. Exh. 4*, Tables 5.5 and 5.12, Col. 10.

Looking at the two reaches of the river, both states show that a reduction in irrigated acreage has occurred in

Reach 3, upstream from John Martin Reservoir. On the other hand, in Reach 4 between John Martin Reservoir and the Stateline, irrigated acreage has increased between 10,000 and 12,000 acres since 1950. Colo. Exhs. 827-30. Increased water use in Reach 4, of course, has the most direct impact on Stateline flows. Total water requirements (April through October) for irrigating approximately 319,000 acres in both reaches were estimated by Colorado to be 820,000 acre-feet and by Kansas to be 798,824 acre-feet. Colo. Exh. 860.

D. Surface Diversions in Colorado.

Diversions from the surface flow of the Arkansas River by the various canal companies in Colorado have long been measured and the results published. These data, however, were carefully reviewed by Colorado for purposes of this action and certain corrections were made. I believe they now represent the most accurate information available. Kansas continued to use the diversion figures maintained and published by the Arkansas River Compact Administration, but its results are nonetheless quite similar to those of Colorado. Average annual diversions for the 1950-85 period, as computed by Colorado, amounted to 884,881 acre-feet. The Kansas data, collected by Spronk Water Engineers, averaged 887,612 acre-feet. Colo. Exhs. 838, 839.

Kansas, however, did not use these diversion figures as input into the H-I model. Instead, it designed the model to *predict* such diversions. This was to allow diversions to vary according to changing amounts of assumed pumping. Actual measurements of diversions were then

used to check the accuracy of the model's predictions. Historic diversions, as calculated by the revised H-I model for 1950-85 averaged 923,415 acre-feet annually. *Id.* To some extent, these figures bear out Schroeder's conclusion that the H-I model has a chronic problem of overpredicting diversions.

The Colorado water budget used actual diversion figures, but then changed them in accordance with estimated gains or losses in river flow based upon changes in pumping. Thus, the Colorado analysis dealt with changes in flow rather than with the total amount of flow. This approach has the advantage, according to Colorado experts, of confining any model error to a smaller portion of the total river flow. However, it also has the disadvantage of not being able to test the water budget results against Stateline flows.

Diversions have increased somewhat in the postcompact years, although transmountain imports have also increased. During the compact negotiations, the engineering committee submitted a report showing that diversions in Colorado over the 1908-42 period had averaged 857,200 acre-feet annually. Jt. Exh. 5 at 20. Based on Colorado's figures, the average for 1950-85 was 884,881 acre-feet. Colo. Exhs. 838, 839. However, the 1950-85 average includes diversions of imported water while the 1908-42 calculation does not. Without consideration of the diversion of transmountain imports, there has been a slight decrease in diversions of about 28,000 acre-feet annually. Kansas argues that the decline is more than offset by increased pumping.

E. Inflow from the Purgatoire River.

The Purgatoire is the largest tributary of the Arkansas River in Colorado and there was some suggestion that the decline in Stateline flows was due in part to reduced inflow from the Purgatoire. Both states relied for their measurements upon the USGS gage on the Purgatoire near Las Animas. For the 1950-85 period, inflow to the Arkansas River averaged 61,659 acre-feet annually. Colo. Exh. 836; Kan. Exh. 50*. Comparing early and late compact years, the 1950-64 period averaged 65,301 acre-feet per year, while the 1965-85 period averaged 48,447 acre-feet.[107] Thus, the measurements show a small decrease in flow, although the early 1950-64 average is heavily influenced by flood flows in a single year, namely, 1955; total flows in 1955 amounted to 232,368 acre-feet. It is also important to note that the models of both states took the Purgatoire flows into account, and isolated Stateline depletions caused by pumping and the WWSP only.

F. Ungaged Tributary Inflow.

Estimating the inflow from ungaged tributaries to the Arkansas River proved to be a difficult problem for all of the experts. Some tributaries have flow measurements for certain years only, but others have no flow records at all. Jt. Exh. 94 at 9-13. One of Colorado's experts, Dr. Young

[107] This comparison omits the flood year of 1965, during which flows were 271,256 acre-feet.

Yoon,[108] at first attempted to apply a rainfall-runoff model to estimate ungaged tributary inflow, but concluded that the rainfall data were insufficient for this approach. RT Vol. 73 at 46. A rainfall-runoff model depends upon developing a reliable correlation between precipitation and the resulting runoff. Here, Dr. Yoon concluded, the scarcity of rainfall stations[109] and the erratic nature of the precipitation[110] precluded such a model. RT Vol. 101 at 36. Colorado ultimately made ungaged tributary inflow the residual in its entire water budget analysis, and used that process to solve for such flows. For the 1950-85 period, Colorado calculated that the total ungaged tributary inflow in Reaches 3 and 4 averaged 182,865 acre-feet per year as corrected. Colo. Exh. 837; Colo. Exh. 4*, A.1 and B.1, Col. 6.

The Kansas estimate was substantially lower, namely, 86,571 acre-feet. The Kansas figures came from Durbin's rainfall-runoff model which developed a relationship between precipitation and runoff derived from watersheds with some gaged streamflow records. RT Vol. 42 at 65. Such annual flows were then processed by a special version of the H-I model (sometimes referred to as "GLOBAL") in order to determine monthly values and to match observed streamflows. RT Vol. 42 at 56-58, 72. This

[108] His qualifications are found in Colo. Exh. 671. His initial assignment was to develop water budgets for the two reaches. RT Vol. 101 at 79.

[109] There were 16 rain gage stations located throughout the tributary basin areas. RT Vol. 101 at 64, 74.

[110] Dr. Yoon testified that most of the rain came in the form of thunderstorms. RT Vol. 73 at 78-79.

monthly adjustment step was dropped by Kansas' replacement experts. Larson testified that it was not necessary, and that the rainfall-runoff model results could be appropriately inserted as direct input into the revised H-I model since overall the model achieved sufficient calibration based on streamflow and diversion data without further adjustments. RT Vol. 100 at 79.

Colorado claims that the Kansas methodology[111] underestimates ungaged tributary inflow, and Larson testified that this might be true, although no amounts were given. RT Vol. 100 at 79-80. However, there is also persuasive evidence that the Colorado figures for ungaged tributary inflow may indicate problems with the Colorado models, and may be too high.

The Colorado water budget analysis accumulates in the results calculated for ungaged tributary inflow any model errors that occur. RT Vol. 127 at 105. And there is indication of such errors. RT Vol. 101 at 75-77. The Colorado models produced what the engineers called "negative" tributary flows, that is, according to the models water sometimes flowed uphill into the tributaries rather than toward the Arkansas River. RT Vol. 101 at 67-69. This meant that the models were calculating too much water. The excess could not be added to the Arkansas River because those downstream flows are specified and fixed in the Colorado models. So, as Larson put it, "you have to

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[111] The parameters used in Durbin's rainfall-runoff model were derived from an analysis of Horse Creek data, and there was uncontroverted evidence that the gage measurements on this creek may have been affected by upstream diversions. RT Vol. 100 at 80.

send water up the tributaries in order to balance the water budget." RT Vol. 127 at 106. Negative flows occurred in Reach 4 in some 70 to 80 months during the 1950-85 period. RT Vol. 101 at 68-69. While Colorado always emphasized the soundness of the data used in its water budget analysis, the models also included some 27 parameters or coefficients that were not field measured, but were estimated on the basis of local experience, judgment or handbooks. RT Vol. 102 at 14. To Larson, the negative tributary flows indicated potential problems and that adjustments were needed within the water budget portion of the Colorado analysis. RT 127 at 107, 112.

Larson also plotted actual measured flows from Big Sandy Creek for the years 1968-82 against the amounts of flow calculated by the Colorado water budget. Kan. Exh. 694. The Big Sandy watershed includes about 60% of the tributary areas in Reach 4. RT Vol. 127 at 110. The calculated flows for these years are substantially in excess of the measured flows for the same years. Larson concluded overall that there were indications that Colorado's ungaged tributary inflows "may be too high." RT Vol. 127 at 113.

Dr. Yoon initially indicated that ungaged tributary inflow declined during the 1970s. On cross-examination, however, he acknowledged that if the single month of June, 1965 were removed from the comparison, the decline would be hydrologically insignificant. RT Vol. 102 at 45, 48, 52-53.

Mr. Durbin did not believe that close accuracy in estimating ungaged tributary inflow was critical. Since such flow represented only a small portion of total flow,

and since the same figures were used in both runs of each pair of comparative runs of the H-I model, he testified that any error would have little impact on the use to which the model was being put. RT Vol. 46 at 97-98, 117; RT Vol. 47 at 37. Colorado, however, points out that the adjusted tributary inflows were used in the H-I model to calibrate the values of nonbeneficial consumption of applied surface water and tailwater runoff. In turn, these factors were used in the calibration of the WANT factors to predict diversions.

It is not possible to determine with accuracy what the ungaged tributary inflows may have been over the years. The best estimate is likely to fall somewhere between the amounts calculated by the two states. However, it does not appear that this factor is critical to the revised H-I model. On rebuttal, Larson produced a series of "sensitivity" runs. Kan. Exh. 691. In one of these runs he used ungaged tributary inflow values that were more like those derived by Colorado. The result was to decrease depletions, but not by a major amount. *Id.*, Comparison 5. This change put the model out of calibration. When Larson adjusted the noncrop ET coefficients in the model in order to bring it back into approximate calibration, the depletions were essentially the same as those originally shown by the revised H-I model. *Id.*, Comparison 6; Kan. Exh. 111***; RT Vol. 127 at 91-92.

G. Consumptive Use by Phreatophytes.

The experts for both states agreed that the consumptive use of Arkansas River water by phreatophytes[112] had increased over the postcompact years. The three major upstream dams and reservoirs have reduced the high flood flows that used to scour the river channel. Undoubtedly, the increased use of river water by natural vegetation in Colorado has had some impact on Stateline flows, but Kansas makes no claim based on any such depletions.

The Kansas expert witness was Dr. David P. Groeneveld, a consulting plant ecologist who specializes in the study of phreatophytes.[113] RT Vol. 24 at 83, 90-91. Colorado used Robert A. Longenbaugh, an assistant state engineer, Colorado Division of Water Resources, and former associate professor at Colorado State University. Mr. Longenbaugh has testified as an expert witness on many previous occasions but never before had qualified as an expert on phreatophytes. RT Vol. 62 at 81-82. His experience in mapping and determining the consumptive use of phreatophytes did appear to be somewhat limited.[114]

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[112] Defined as plants that receive all or part of their water from groundwater. RT Vol. 24 at 116. More commonly, phreatophytes are thought of as natural riparian vegetation. Along the Arkansas River "woody" phreatophytes include salt cedars, cottonwoods and willows. "Herbaceous" phreatophytes include kochia, saltgrass, cattails and other grasses.

[113] His curriculum vitae is Kansas Exhibit 487, and includes considerable experience in using aerial photography to map vegetation.

[114] His qualifications appear in Colorado Exhibit 664.

Both experts relied extensively on two prior reports, one published by Bittinger and Stringham in 1963,[115] and one by Lindauer and Ward in 1968.[116] RT Vol. 24 at 106; RT Vol. 62 at 109, 117. Bittinger estimated the consumptive use of phreatophytes from Pueblo to the Stateline to be about 65,900 acre-feet annually, with an accuracy within 20%, plus or minus. Jt. Exh. 61, Table 9 at 20; RT Vol. 26 at 28, 60. Lindauer mapped the vegetative cover but did not actually estimate consumptive use.

Dr. Groeneveld attempted to determine what changes, if any, had occurred since the Bittinger report. RT Vol. 24 at 136. He concluded that use by phreatophytes had increased by about 14,000 acre-feet annually over Bittinger's 1957 estimate, reaching a total of 79,424 acre-feet in 1983. Kan. Exh. 526. He agreed that there was also a range of error in this estimate and that the increased use might be as low as 10,000 or as high as 19,000 acre-feet. RT Vol. 26 at 81. Most likely, however, he thought the range was between 12,000 and 16,000 acre-feet. *Id*.

Groeneveld employed accepted techniques comparing the 1957 aerial photos used by Bittinger with a set of 1983 color, infrared aerial photographs. Transects across the river were established at 80 locations between Pueblo and the Stateline. (Bittinger had used only 18.) RT Vol. 24 at 121; RT Vol. 26 at 41. The type of vegetation and the percentage of ground covered by such vegetation were determined along each of these transects. In this process,

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[115] Jt. Exh. 61.

[116] Jt. Exh. 62.

Groeneveld used a stereoscope which magnifies depth perception and provides three-dimensional viewing of the aerial photography. Evapotranspiration rates ("ET"), which are available in the literature for each type of vegetation, were then applied to the percent of coverage and area in order to reach an acre-feet figure for consumptive use. RT Vol. 24 at 127-28. The Kansas study of phreatophytes was limited to the flood plain of the river.

A recent report[117] of the United States Department of Agriculture, done in cooperation with the Colorado Water Conservation Board, produced an estimate fairly close to Groeneveld's figure. Jt. Exh. 108. The report separately estimates consumptive use by phreatophytes in five reaches of the river between Pueblo and the Stateline, giving a total of 72,900 acre-feet. *Id*, Table A-14 at A-36.

Mr. Longenbaugh's estimate for the increase in consumptive use between 1957 and 1983 was 31,718 acre-feet compared to Groeneveld's estimate of 14,000. Colo. Exh. 786. However, Longenbaugh's initial base from which he calculated the increase was considerably higher. As a result, Longenbaugh estimated that consumptive use by phreatophytes averaged 123,876 acre-feet annually over 1950-85. Colo. Exh. 864. The comparable Kansas figure was 70,580. *Id*. While Longenbaugh did not testify to a specific range of error in his estimates, there is evidence to indicate that his figures were less reliable than those developed by Kansas.

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[117] The study was authorized in 1979, but the report does not bear a date. Colorado's counsel, however, believes that it was published in 1986. RT Vol. 63 at 22.

To begin with, Longenbaugh used George Moravec's[118] 1985 black and white aerial photos and mylar overlays to determine the boundaries of the area where phreatophytes were located, and the amount of acreage involved. RT Vol. 62 at 107; RT 63 at 81. Moravec determined that in 1985 there were 29,519 acres of woody phreatophytes between Pueblo and the Stateline, and 13,026 acres of herbaceous phreatophytes. Colo. Exh. 487, Table 1 at 8; RT Vol. 62 at 159. This acreage was also confined to the floodplain of the river. RT Vol. 61 at 68.

Moravec testified that he established his boundaries in the same manner as Bittinger. RT Vol. 61 at 71, 81-82. However, Bittinger did not map any boundaries for herbaceous phreatophytes. RT Vol. 63 at 105, 116. Nor did Lindauer. *Id.*; RT Vol. 64 at 94; Jt. Exhs. 61, 62. Indeed, Moravec provided no good explanation as to how the boundaries for herbaceous phreatophytes were established, and how he distinguished herbaceous phreatophytes from the nonphreatophytic cover in the surrounding upland areas. Some of his herbaceous acreage extended a half mile or more from the river, and included areas where the groundwater levels appeared to be too far below ground surface to supply any herbaceous phreatophytes. RT Vol. 64 at 41-45; RT Vol. 63 at 114; Colo. Exh. 685.

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[118] Mr. Moravec is a hydrogeologist with the Colorado Department of Health, and previously was with the Colorado Division of Water Resources. He has had practical experience with aerial photos and in using them to map irrigated acreage and vegetation, but no formal education in plant ecology. His qualifications are found in Colorado Exhibit 666.

Accepting the Moravec boundaries and acreage, however, Longenbaugh then assumed that this total amount of acreage, for both woody and herbaceous phreatophytes, had remained constant throughout all years since 1950. RT Vol. 63 at 138. To develop the herbaceous acreage for earlier years, he increased such acreage backwards in time by taking the difference between the amount of total acreage and the amount assigned in each of those earlier years to woody phreatophytes. *Id.* at 106, 137. I find no support in the evidence for these assumptions. They result in much greater phreatophytic acreage than the well accepted Bittinger and Lindauer reports calculated, and account for much of the higher consumptive use figures developed by Colorado. To determine the consumptive use of herbaceous phreatophytes, Longenbaugh also assumed that the cover was 100 percent. *Id.* at 181.

The actual consumptive use for herbaceous phreatophytes in 1985 was calculated to be 3.91 acre-feet per acre in Reach 3 above John Martin Reservoir, and 3.58 acre-feet downstream in Reach 4. Colo. Exh. 438*. These amounts were based upon a curve developed by Longenbaugh that relates the amount of consumptive use by herbaceous phreatophytes to the depth to groundwater. Colo. Exh. 679*. This curve shows that groundwater must be within one foot of the surface of the ground for herbaceous phreatophytes to consume 3.91 or 3.58 acre-feet per acre. RT Vol. 64 at 36-37. Colorado's groundwater models calculated these sensitive depths to water and applied the curve in Colorado Exhibit 679* in order to arrive at the consumptive use figures. RT Vol. 63 at 111-12, 136; RT Vol. 64 at 45. Longenbaugh expressed

confidence that the groundwater models provided the "right answers." RT Vol. 64 at 45.

However, actual well measurements, not model output, indicated otherwise. Of 27 wells located along and near the river, only four showed water levels within a foot of the ground surface. Colo. Exh. 685. Longenbaugh attempted to justify the 3.91 and 3.58 consumptive use figures on the ground that they were averages of some high areas of use[119] and other areas where the consumption was zero. RT Vol. 64 at 54-55. However, Colorado had no quantitative data in the areas of such high use vegetation, and to acknowledge areas of no consumptive use would indicate that Moravec's boundaries and acreage were incorrect.

Other questions could be raised about the Colorado estimates,[120] but perhaps this is sufficient. Certainly the water use by native vegetation over 150 miles of river and for a 36 year period cannot be determined with precision. However, it is not clear how significant the differences between the estimates of the states are for modeling purposes. This was not an important issue in the post-trial briefs of the parties. Nonetheless, to the extent that

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[119] For example, cattails at 5.7 acre-feet per acre.

[120] For example, the percent of cover used in the calculations for woody phreatophytes was largely the result of subjective judgment rather than any scientific methodology. RT Vol. 63 at 80, 87-88, 142-44; RT Vol. 64 at 85. Longenbaugh's percentage substantially increased the earlier Bittinger and Lindauer estimates, and contributed heavily to his final consumptive use estimates. His approach can be contrasted with Groeneveld's direct analysis of 80 representative transects of 1983 aerial color photos.

consumptive use by phreatophytes can significantly affect the modeling of Stateline depletions, I find that the Kansas estimates are most likely to reflect actual use.

H. Results of Colorado Water Budget Analysis.

The impacts of postcompact pumping in Colorado on Stateline flows as derived from the Colorado water budget analysis can be found in Colorado Exhibit 135*, p. 6.1, col. 16. The results for the 1950-85 period are not immediately apparent since the exhibit does not provide totals. However, Helton confirmed that total depletions to Stateline flows for the full 1950-85 period amount to 582,696 acre-feet. RT Vol. 134 at 13; RT Vol. 117 at 75, 102.

These results are derived from what Colorado called its "What-if 2" scenario. In that analysis, Colorado made one model run based on historical conditions. In that run total pumping averaged 145,199 acre-feet annually, which is the amount estimated by Colorado. Colo. Exh. 135* at 1.1. Colorado then paired the historical run with a second model run in which pumping levels were held to the so-called precompact amounts. The precompact allowance averaged 49,275 acre-feet annually. Thus, the What-if 2 comparison registered the impact on Stateline flows of the difference between Colorado's view of allowable precompact pumping and later total pumping, namely, an average of 95,925 acre-feet annually for the 1950-85 period. RT Vol. 133 at 53-54. This is comparable to an annual average of 150,394 acre-feet which Kansas used in determining Stateline depletions from postcompact pumping. Kan. Exh. 731.

The Colorado figure of 582,696 represents depletions caused by postcompact pumping in Colorado in terms of total Stateline flows, not usable flows. RT Vol. 134 at 14. Colorado presented no evidence of its own on depletions of usable flow after the year 1969.[121] Colo. Exh. 135*, pages 7.1-7.3. According to Helton, there was not an adequate basis for making a determination of usable flow in the absence of records from the gaging station at Garden City. RT Vol. 134 at 14; RT Vol. 117 at 101-02. From 1970 through 1986 the gage was maintained only for flood flows, although continuous recorder charts remained in place which reflected water levels at the gage. Kansas later used these data to estimate daily flows past Garden City; any such flows were considered by Kansas to be unusable.

While Colorado introduced no evidence reducing the 582,696 acre-feet of depletions of total flow to depletions of usable flow, Kansas did make such an effort. Larson testified that this amount translated into 411,000 acre-feet of depletions of usable flow. RT Vol. 127 at 94. In making this calculation, Larson applied the Spronk method of determining usable flow. The validity of this approach is discussed in Section XXI.

Colorado's depletion figure of 582,696 represents Stateline depletions which still remain *after* deleting the effect of return flows from transmountain imports. RT Vol. 134 at 14; RT Vol. 115 at 75; Colo. Letter of 8-24-93 at

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[121] Helton did, however, critique the Kansas evidence on usable flows which covered the full 1950-85 period. He also proposed different coefficients if the Kansas methodology were to be used. This subject is covered more fully in Section XXI.

11. Helton testified that the results of the Colorado water budget were reasonable on a monthly basis, more accurate on an annual basis, and "more accurate yet" on a long-term average. RT Vol. 117 at 100.

While Colorado's depletion figure is high because not reduced to usable flows,[122] it is also low in two other respects. First, the assumed amount of postcompact pumping is not sufficient; this issue is treated in Section XV. Second, the Colorado analysis offsets what has been termed the "clear water effects." The construction of Pueblo Dam reduced the amount of silt in the river. In turn, this increased seepage in the upstream canals and laterals, particularly in the Bessemer system. Helton testified that farmers were thus required to pump more water in order to obtain the same total irrigation supply. RT Vol. 134 at 16-17.

In Colorado's What-if 2 run, therefore, seepage losses were allowed to increase, thereby resulting in lower calculated depletions at the Stateline. *Id.*, at 22. In essence, Helton treated the pumping increment which offsets these increased seepage losses as part of Colorado's historic water supply, rather than as postcompact well pumping. While the impact is apparently small, I do not

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[122] Colorado maintains that the figure is also high for other reasons. In its "What-if 2" analysis Colorado did not "reoperate" John Martin Reservoir. Had it done so, Colorado states, the depletion amount would have "declined substantially." RT Vol. 142 at 103. Helton also testified that the Colorado analysis did not consider that some Colorado ditches would have exercised their surface rights more frequently if supplemental wells were not available. RT Vol. 117 at 131-33. However, no specific or quantitative evidence was submitted on these points.

believe this is proper. RT Vol. 117 at 70-71. There is no question about the substantial benefits accruing to Colorado from the construction of Pueblo Dam. *Id.*, at 74. Sediment control for the benefit of upstream Colorado ditches was one of the purposes of Pueblo Reservoir. Jt. Exh. 166 at 23, 25, 26. Any burdens from the project must also be accepted.

In an effort to compare the revised H-I model results with those derived from Colorado's water budget, Kansas made one run of its model using Colorado's figures for pumping and an approximation of Colorado's What-if 2 scenario.[123] For the same amount of postcompact pumping, Colorado's own What-if 2 analysis calculated total Stateline depletions of 583,000 acre-feet for 1950-85, while the H-I model run indicated depletions of only 395,000 acre-feet. Kan. Exh. 642; RT Vol. 127 at 93. Kansas points to this comparison to show, despite Colorado's many criticisms of the H-I model, that the revised model actually produces smaller Stateline depletions per acre-foot of pumping than Colorado's own water budget. Colorado does not deny this fact.[124] Rather, it attempts to deflect

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[123] In its What-if 2 scenario, Colorado used the figure of 3,453,000 acre-feet as the difference between its claimed precompact allowance and total pumping for the 1950-85 period. Kansas originally used 5,414,000 acre-feet as its comparable figure on which depletions were based, as shown in Kansas Exhibit 111***. However, in this run of the revised H-I model, Kansas used Colorado's pumping, namely, 3,453,000 acre-feet. Kan. Exh. 642.

[124] "Kansas also asserts that Colorado made many efforts 'to minimize the calculated effects of pumping on the stateline flows.' *Id.* at 74. This assertion has a hollow ring given the fact that the Colorado analysis shows higher depletions than the

the argument, saying that nonetheless the conclusions to be drawn from Colorado's analysis "are very different." Colo. Response Br. at 93.

Colorado refers to Helton's conclusion that transmountain return flows have largely offset the impacts of postcompact pumping above John Martin Reservoir. But this does not explain away depletions at the Stateline of 582,696 after the offset from transmountain flows has been taken into account. Colorado also refers to Helton's conclusion that depletions of Stateline flows were due largely to wells constructed east of the Buffalo headgate after 1965. Again, while this may be useful in any remedy phase of the trial, the location in Colorado of any wrongful pumping, insofar as liability is concerned, does not matter if the result is a compact violation at the Stateline. The cause of the calculated depletions is not in dispute. Both Colorado's What-if 2 scenario and Kansas' H-I model runs were specifically designed to isolate the impacts of postcompact pumping in Colorado on Stateline flows. Colorado's analysis shows that Stateline depletions are equal to 17% of the amount pumped, while the Kansas estimate is only 11.3%. Calculated from Kan. Exh. 642.

Colorado's What-if 2 analysis also carries a column entitled "Potential Impact on Kansas." Colo. Exh. 135*, page 6.1, column 17. This again considers the impact of 3,453,000 acre-feet of postcompact pumping. The column shows an average "potential impact" of 7,755 acre-feet

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results calculated by the H-I Model, as revised [by] the Kansas replacement experts." Colo. Response Br. at 77; see also pages 93-94.

annually for the 1950-85 period, or 279,180 acre-feet for the whole period. It is computed by taking 40% of the change in conservation storage in John Martin Reservoir and adding depletions in Stateline flow from April through October. RT Vol. 134 at 22-23. Depletions occurring from November through March were not included because, according to Helton, those flows "weren't used in Kansas." RT Vol. 115 at 78. Helton testified that these potential impacts were not the same as depletions of usable flow, but would be "further reduced for the times when Kansas did not fully use all of the water that was available there historically." RT Vol. 134 at 23.

I. Colorado's Modifications to the Revised H-I Model.

During the course of the trial, Colorado developed the capability of operating and adjusting the Kansas revised H-I model. Schroeder made a number of changes to the H-I model input and code, including removal of the canal capacity and diversion reduction factors. Colo. Exhs. 1008, 1009. He then attempted to recalibrate the model, and in his opinion achieved a "similar degree of accuracy" to that obtained by Kansas. RT Vol. 138 at 137; RT Vol. 139 at 18; Colo. Exh. 1010. In all, he made some 900 runs, but presented, in Colorado's Exhibits 1011 and 1012, the results of only a limited number of comparisons. RT Vol. 139 at 42. However, he was not prepared to sponsor these results. While he believed that the Stateline depletions shown by his modified H-I model runs were more appropriate than the depletions shown in Kan. Exh.

111***,[125] he still testified that his modified version of the H-I model was "inaccurate, inappropriate, and not a reasonable tool." RT Vol. 139 at 96, 67. None of the results depicted in Colorado Exhibits 1011 and 1012 was an "appropriate quantification," he said. RT Vol. 140 at 97.

Kansas objects strongly to Colorado's modifications of the H-I model, claiming they were "selective." Kan. Answer Br. at 28. However, it seems unnecessary to treat Kansas' criticisms in detail here in view of Schroeder's own testimony that he did not adopt the H-I model results, even with his modifications.

J. Conclusions.

Colorado's own water budget analysis essentially disposes of the issue of liability from pumping, except for possible affirmative defenses. And none of those defenses is asserted as a complete bar to all liability. Laches is raised as to wells constructed prior to 1965, but Colorado's experts have testified to depletions from wells drilled later, below the headgate of the Buffalo Canal, the last canal in the Colorado system. Colorado also asserts that the benefits of the 1980 Operating Plan should offset the depletions caused by wells located below John Martin Reservoir. However, I have already concluded in Section

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[125] Schroeder's version of the revised H-I model still showed substantial depletions from pumping. Considering depletions alone, without accretions or adjustment for usable flow or offsetting the return flows from transmountain imports, Stateline depletions were 545,000 acre-feet for the 1950-85 period. This compares with the Kansas estimate of 612,000 acre-feet. Kan. Exh. 742. Both of these estimates used Kansas' figure for postcompact pumping.

XIV that the 1980 Operating Plan was not intended to, and should not, cancel out compact violations. The laches and mitigation arguments made during the consideration of my Draft Report are even more limited.

The Colorado estimate of Stateline depletions caused by postcompact pumping over the 1950-85 period, namely, 582,696 acre-feet, represents depletions of total flow, not of usable flow. However, there is sufficient evidence in the record to conclude that these depletions would still be substantial, even after reducing them to usable flow. Moreover, I have concluded in Section XV that the amount of pumping which Colorado has used to calculate Stateline depletions is low. Colorado excused almost two million acre-feet of pumping from precompact wells, which I have found to be erroneous.

The actual amount of depletions of Stateline flows from postcompact pumping still remains a major issue. If the Court finds there is liability, then additional evidence will be required during the remedy phase of the trial to refine the amount of depletions in accordance with this Report or the Court's directions. The amount of depletions is critical not only for damages, but also in fashioning a remedy for the future. Colorado now has a limited program in place to control pumping, but it has proved to be inadequate to prevent Stateline depletions. It remains to be seen whether modifications in this program can prevent future compact violations or more stringent controls will be required. It bears remembering that the Arkansas River Compact does not preclude pumping in Colorado, but only postcompact pumping (not offset by transmountain imports) that causes material depletions in the usable flow of the Arkansas River at the Stateline.

SECTION XXI

USABLE FLOW

The Arkansas River Compact provides that future development or construction shall not materially deplete Stateline flows "in usable quantity or availability for use to the water users in Colorado and Kansas." There is no definition of usable flow in the compact itself, and virtually no discussion of the concept in the record of compact negotiations.[126] The concept of usable flow first seems to have appeared in the 1943 decision in *Colorado v. Kansas*, 320 U.S. 383 at 396-97. Justice Roberts wrote on behalf of the Court:

> "The Kansas ditches are capable of diverting water only up to 2,000 c.f.s. When the flow is greater the excess cannot be diverted and used. It is admitted that the character of the flow of the river in Colorado is variable from year to year, from season to season, and from day to day, and the main river below Canon City may be almost without water one day, run a flood the next day, and, on the following day, be in practically its original condition. Thus it appears that both in Colorado and in Kansas there may at one time be flood water unavailable for direct diversion and, at another, not enough water to supply the capacity of diversion ditches. *The critical matter is the amount of divertible flow at*

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[126] There is some discussion in the record of the seventeenth and last meeting of the commissioners concerning this portion of Article IV-D, but the focus is on the term "materially" and offers no help on the meaning of usable flows. Jt. Exh. 3 at 17-32 to 17-37.

times when water is most needed for irrigation. Calculations of average annual flow, which include flood flows, are, therefore, not helpful in ascertaining the dependable supply of water usable for irrigation." (Emphasis added.)

Shortly after this Supreme Court decision, C. L. Patterson, then chief engineer for the Colorado Water Conservation Board, offered his plan for the operation of John Martin Reservoir and the administration of water rights along the Arkansas River. This proposal was approved by the Colorado Attorney General and its chief engineer. Jt. Exh. 8 at 33. In that plan, Patterson recommended the following definition of usable flows:

> "Divertible Stateline flows are those at rates less than 2,000 cfs. in summer months (Apr.-Sep.) and less than 800 cfs. in winter months (Oct.-Mar.);
>
> "Usable Stateline flows are those portions of the divertible flows in volumes less than 30,000 A.F. in one summer month and 120,000 A.F. in one summer season, and in volumes less than 10,000 A.F. in one winter month and 40,000 A.F. in one winter season; and,
>
> "All Stateline flows in excess of said rates and volume are considered undivertible and unusable in Kansas." Jt. Exh. 8 at 23-24.

During the course of the trial, Kansas experts applied this Patterson definition to the total depletions of Stateline flow. The result produced substantially higher quantities of usable flow than any of the approaches used and

recommended by the Kansas experts.[127] Kan. Exhs. 646, 648, 683.

A. The Durbin Approach.

Mr. Durbin began to analyze the usable flow issue by first plotting actual diversions in Kansas during the irrigation season against actual Stateline flows. Kan. Exh. 127. He did this for April through October of each year during 1951-85. Through this process, he developed a relationship between diversions and Stateline flows. RT Vol. 45 at 103. These data showed that river flows over 40,000 acre-feet per month were not diverted; moreover, they showed that the April-October diversions would not increase above approximately 30,000 acre-feet per month, regardless of the amount of river flow. *Id.* at 108. On average, Durbin concluded that about 78% of the Stateline flows during the summer were diverted. *Id.* at 109. Flows above 40,000 acre-feet per month during April-October, or above 140,000 acre-feet in total for the whole period, were considered by Durbin not to be usable. *Id.* at 113.

Durbin went through the same process for the winter months of November through March for the period 1951-85. Kan. Exh. 127B. On average, Durbin concluded that 24% of the winter flow was diverted, subject to a cap

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[127] For the April-October period, the Patterson formula indicates that 92% of the Stateline flows would have been used; Spronk's comparable estimate is 66%. For the November-March period, the respective estimates are 85% and 42%. RT Vol. 89 at 63.

of 7,500 acre-feet per month, and to a seasonal cap of 40,000 acre-feet. RT Vol. 45 at 111-12.

Finally, Durbin developed a relationship between Stateline flows and the amount of river flow percolating underground as groundwater recharge. Kan. Exh. 128. Durbin testified that between the Stateline and the Bear Creek Fault zone the river alluvium is very much like the valley fill alluvium upstream in Colorado, and is underlain and bordered by essentially nonwaterbearing rock. RT Vol. 45 at 96. In this reach of the river he said that groundwater recharge was minor, and recharge was not included in his calculations. *Id.* at 97. Downstream from the fault zone the river alluvium is underlain by the Ogallala formation. Between the fault and the Garden City gage, Durbin testified that part of the river flow percolates downward and laterally into the Ogallala formation. *Id.* at 97. For his groundwater analysis, Durbin used the period from 1925 to 1940. He calculated recharge during these years by taking the flows at the Syracuse gage, and subtracting downstream diversions and any flow past the Garden City gage. The balance, he said, went to groundwater recharge. *Id.* 115-17. On average, he concluded that 15% of the Stateline flows were used for groundwater recharge. *Id.* at 116.

B. The Larson Modifications.

As part of Kansas' replacement case, Larson reviewed the Durbin exhibits on usable flow. He prepared certain revised exhibits, following Durbin's concept but with some minor corrections in data. He also

eliminated certain high flow months from the calculations, and lengthened the historic period of record used to determine groundwater recharge. Kan. Exhs. 127**, 127A**, 127B**, 128**; RT Vol. 99 at 127-29, 133-36.

As a result, Larson modified Durbin's coefficients, using 72% for the summer irrigation months and 25% for the winter months. RT Vol. 100 at 11. Larson pointed out that Kansas farmers sometimes diverted all of the winter flows available and at other times no winter flows were diverted. On average, however, 25% of Stateline flows were diverted for use during the winter months. RT Vol. 99 at 136. Larson also reduced the percentage of Stateline flows going to groundwater recharge from 15% to 9.9%. RT Vol. 100 at 11.

In calculating groundwater recharge, Larson used the period of 1925 to 1948, excluding the flood year of 1942. RT Vol. 99 at 137. He used the same methodology as Durbin, namely, taking the annual flow at the Syracuse gage, and then subtracting the annual flow at the Garden City gage as well as the diversions from the various Kansas ditches between them. *Id.* at 138. The balance constituted average net groundwater recharge. *Id.* Larson testified that he selected these early years before the compact was signed so that any change in recharge that might have occurred after the compact would not be part of the analysis. *Id.* at 140.

Later in this section, the method devised by Spronk for determining usable flow is described. Larson thought that the Spronk methodology was better than the Durbin approach because it applies a usable flow factor for each

month, based on a daily analysis, as opposed to a long-term average value. *Id.* at 142.

C. The Helton Approach.

Colorado's evidence on usable flow was presented through Helton. In his analysis, he examined the Stateline flows, the diversions by the Kansas ditches, gains and losses in the river in Kansas between the Stateline and Garden City, and the flows passing Garden City on a monthly basis. RT Vol. 86 at 41-43; Colo. Exh. 238*. Using Colorado's analysis of depletions, he determined depletions of Stateline flows that would have affected unused Stateline flows during each month. RT Vol. 86 at 82. His analysis required streamflow records for the Garden City streamflow gage, and since no daily streamflow records were published after 1969, he had no opinion on usable flows for the 1970-85 period. RT Vol. 117 at 101-02, 106. Obviously, this is a severe limitation upon the usefulness of the Colorado evidence.

Helton's approach covered the years from 1950 through 1969, and actually applied to only 169,974 acre-feet of depletions out of the total depletions of 582,694 acre-feet calculated by Colorado. RT Vol. 117 at 103. That is, his analysis did not cover 412,700 acre-feet of depletions, as determined by Colorado, which were caused by pumping after 1969. *Id.* Moreover, Helton concluded that depletions of Stateline flows during the winter were not depletions of usable flow. RT Vol. 117 at 103-04. In essence, he did not consider any winter flows to be usable, and on that basis removed still another 85,536 acre-feet from his calculations. *Id.* at 103-05.

I find that it was incorrect to regard all winter flows as unusable. There is no evidence that the compact negotiators intended such a result. Indeed, Patterson, one of the Colorado commissioners, in the plan he proposed earlier in the ongoing river negotiations, defined usable flow to include winter flows. Jt. Exh. 8 at 23-24. The record shows actual wintertime diversions in Kansas, and these diversions were plotted by the Kansas experts in reaching their wintertime coefficients. Kan. Exh. 684. Winter flows also contribute to usable groundwater recharge.

Helton's methodology included the computation of gains, that is, increases in the flow of the river within Kansas. Colo. Exh. 238*, columns 8, 13, 14. The evidence is not altogether clear on the sources of such gains. Apparently they would include groundwater outflow, return flows, and surface runoff within Kansas. RT Vol. 86 at 48, 50, 63. Helton testified that such gains did not include return flows from deep wells pumping from the Ogallala Aquifer, although that issue was not explored in detail. RT Vol. 86 at 51. Of course, there were also shallow wells in Kansas which pumped from the river alluvium, and presumably some groundwater from these wells would reach the river.

The importance of Helton's calculations of river gains in Kansas is that he allocated all surface diversions first to such gains. RT Vol. 117 at 87. That is, his calculations assume, to the extent of any gains, that Kansas farmers diverted local sources of water rather than taking an equivalent amount of Stateline flows. Whether as a result of his gains analysis or not, Helton concluded that large amounts of Stateline flows were not used, at least in the

early postcompact years. Colo. Exh. 238*, column 23. Presumably, in his view, these were flows available for use in Colorado. Asked about his reasons for integrating the concept of gains into his approach, Helton testified, "Well, I think Kansas should be required to use water that is available in Kansas prior to the time that it either makes demands out of conservation storage in John Martin Reservoir or claims a credit for a diversion [by Colorado] of state line flow." RT Vol. 117 at 88.

I find nothing in the record of compact negotiations, or in the compact itself, to support this view. The essence of the compact, apart from the provisions relating to John Martin Reservoir, was to protect the status quo with respect to the division of Arkansas River water between the states. There was no intent that Kansas should be required to make use of other Kansas water supplies before being allowed to complain of uses in Colorado that would materially deplete Kansas' usable share of Stateline supplies.

Helton also included transit losses, that is, seepage going to groundwater recharge, as part of the Stateline flows not diverted. RT Vol. 86 at 52-53, 62. I also find this to be incorrect. The definition of usable flows should include water for groundwater recharge. Kansas made this point in the last meeting of the compact negotiators, without objection from Colorado. Commissioner Knapp stated that uses in Kansas included "not only the actual ditch diversions which are available for measurement, but the water which has gone into ground storage through the years to recharge the pumping area." Jt. Exh. 4 at 17-34. He estimated the amount of water used for

groundwater recharge to be about 25,000 acre-feet annually. *Id.*

Helton did not agree with the methodology used by the Kansas experts in determining usable flows, although he acknowledged that Larson's mathematical calculations were correct. RT Vol. 115 at 15, 27; RT Vol. 134 at 29. Helton testified that if the Durbin methodology were to be used, then different coefficients would be more appropriate. RT Vol. 115 at 19, 26; Colo. Exh. 983. His coefficients, which were generally lower than Larson's, were derived from an analysis of Kansas diversions during 1950-69. RT Vol. 115 at 16. These coefficients included the concept of allocating certain diversions to river gains within Kansas. *Id.* Helton's coefficient for groundwater recharge was 6.6 percent, as opposed to 9.9 percent used by Larson.

For his calculations, Larson used the precompact period of 1925-48, excluding the flood year of 1942. Helton's calculations, on the other hand, were based upon the early postcompact period of 1950-69. RT Vol. 115 at 18. Helton testified that this later period was more appropriate because it represented operations under the compact, and a period before wells in Kansas had begun to deplete river flows in large amounts. RT Vol. 115 at 18; RT Vol. 117 at 92-93. He objected to the period used by Larson because it did not represent fully "the operation of John Martin Reservoir and the Arkansas River Compact." RT Vol. 115 at 18. However, the Larson approach more closely matches the amount of flow used for groundwater recharge under precompact conditions. I have concluded that the compact was intended, in part, to reflect generally the division of waters between the

states and the uses that had been occurring. Moreover, the period of time selected by Larson does not reflect any increase in recharge that may have been brought about by well development in Kansas.

D. The Spronk Approach.

As part of Kansas' replacement case, Spronk Water Engineers developed a new method to quantify depletions of usable Stateline flows. This procedure depended, in part, upon the reconstruction of daily flow measurements at the Garden City gage. The USGS gage at Garden City was maintained only as a peak flow gage from 1970 to 1985. However, it was learned in the spring of 1991, well after the trial had begun, that although daily streamflow records had not been published, continuous recorder charts were in place during the 1970-85 period. These charts reflected water levels at the gage, that is, "stage heights," from which river flows could then be computed.

Colorado objected strongly to the accuracy of the reconstructed flow records, and this became a subject of considerable testimony. To translate the readings from the water level gage into flow measurements of cubic feet per second, a rating curve is used. Here, the Arkansas River channel is sandy and about 100 feet wide. If the channel changes significantly, a new rating curve must be developed, and in any event, the curve must be checked from time to time against actual flow measurements. In addition to the water level data from the continuous recorder, the USGS made 26 actual measurements of flow during the 1970-86 period, together with some 70 observations of

"no flow" and 55 observations of flow but without measurements being made. RT Vol. 108 at 52-53. The argument turned on whether sufficient measurements were taken, and whether the seven different rating curves developed and used during this period were adequate to reconstruct daily flows as used in the Spronk analysis.

Spronk's object was to determine for each day whether all of the Stateline flow was being used. If not, then additional flow at the Stateline on that day was considered to be unusable. As part of that analysis, he assumed that if the outflow at the Garden City gage were less than 5 cfs, then Kansas was fully using the Stateline flow.[128] Spronk's analysis, therefore, did not require refined accuracy. Moreover, Colorado's expert witness acknowledged that the data relied upon by Spronk might be adequate to identify high flows, moderate flows, low flows and no flows. RT Vol. 109 at 19. I believe that the reconstructed gage measurements were probably sufficient for the purpose for which they were used. However, there are more serious concerns with the Spronk approach.

In determining whether Stateline flows were being fully used in Kansas, Spronk applied a number of other factors besides the flow, or lack of it, at the Garden City gage. RT Vol. 89 at 40-43. Overall, the object was to determine the percentage of days in each month when flows were being fully used in Kansas. Those percentages

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[128] Between 1970 and 1973, Spronk used 20 cfs in order to recognize discharges of nonriver water from the Garden City power plant that were introduced into the river just upstream from the Garden City gage.

were then applied to the monthly outputs of changed Stateline flow calculated by the revised H-I model. RT Vol. 89 at 60; RT Vol. 100 at 12-14. For example, in May of 1955, Spronk determined that more flow could have been used in sixteen days of the month, or a ratio of 16/31. That is a percentage of 51.6, which Spronk applied to the depletions calculated for May, 1955, namely 1,043 acre-feet. The result became 538 acre-feet of depletions of usable flow for that month. RT Vol. 89 at 59-61; Kan. Exh. 565***.

Kansas argues that applying long-term averages, as Durbin did, underestimates the depletions of usable flow during the late 1970s and early 1980s. That was a period of drought, and according to Kansas most of the low flows were usable. The Spronk analysis was said to correct this inequity.[129] Kansas states that the Spronk methodology gives substantially the same results as the Durbin analysis, except from approximately 1975 to 1982 when the Spronk analysis more properly represents actual hydrologic conditions. Kan. Opening Br. at 107; RT Vol. 142 at 15-16. However, as Colorado points out, virtually the entire H-I model is based on average data. RT Vol. 142 at 46. Durbin testified to the appropriateness of using averages to represent hydrologic data. RT Vol. 51 at 78. Overall, there is no question about the fact that the

[129] As the United States notes, the fact that virtually all flows during a dry period may be usable does not "carry this argument." RT Vol. 142 at 48. The more fundamental question is what the Stateline flows and depletions were before usability criteria were applied.

Spronk approach produces the greatest amount of depletions of usable flow. For example, using Spronk's calculations of usable flow, the revised H-I model yields total depletions from both pumping and the WWSP of 489,000 acre-feet for 1950-85. Using the Durbin analysis, with the Larson coefficients, this total drops to 365,000 acre-feet. Colo. Exh. 975, Comparison 1.

Colorado acknowledges that in theory, at least, there is some validity to the daily approach used by Spronk. Colo. Closing Well Br. at 237. However, the Colorado experts testified that the Spronk usable flow method was not appropriate for use with the revised H-I model. The Spronk analysis assumes that the H-I model can accurately predict changes of Stateline flow on a monthly basis. RT Vol. 110 at 126-27; RT Vol. 111 at 32, 38-39, 128-29; RT Vol. 115 at 23-24. I believe the objection is sound.

There was a great deal of testimony by both Colorado and United States experts on this issue, and they generally agreed that the H-I model results were not reliable on a monthly basis. See, e.g., U.S. Exh. 26*, 29; RT Vol. 118 at 92 *et seq.*; RT Vol. 114 at 107-111; RT Vol. 133 at 21.[130]

[130] Although the H-I model was improved by Kansas' replacement experts, the fundamental structure of the model was not changed. Durbin's testimony shows that the model was originally designed to predict changes in Stateline flows. In his opinion, the model was a "good predictor" when "looking at long periods of time." RT Vol. 51 at 72. Using "a long-term average," he testified that the model predicted actual Stateline flows with a "fair degree of accuracy." *Id.* at 84. If multi-year periods were averaged, Durbin said "there would begin to be more and more correspondence between the model and what was actually observed." RT Vol. 44 at 86.

Helton pointed out that the mean absolute deviation[131] at the Stateline, excluding the high flows of 1965, was about 4,200 acre-feet per month compared to an average monthly flow of 10,500 acre-feet. On a monthly basis, he testified that the revised H-I model "did not predict closer than 40 percent." RT Vol. 114 at 111. For the 1976-85 period, the maximum monthly overprediction was 21,018 acre-feet, and the largest underprediction was 19,755 acre-feet. U.S. Exh. 29. Using a standard deviation of error analysis, one of the United States experts testified that 32% of the time the monthly error was greater than 6,000 acre-feet. RT Vol. 118 at 98.

Colorado's experts also criticized the Spronk usable flow analysis because it did not factor out increased losses in the Arkansas River in Kansas due to increased well development in Kansas in the 1970s. RT Vol. 111 at 129, 132-36; RT Vol. 112 at 8-41, 56. To the extent that well development in Kansas may have increased the amount of streamflow going to groundwater recharge, the point is valid. Article IV-D of the compact covers future developments in Kansas, as well as in Colorado. Larson testified that during the precompact years approximately 10 percent of the Stateline flows went to groundwater recharge. If surface flows available for diversion were reduced

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[131] This concept is intended to give a true indication of the difference between observed and predicted values. It eliminates a close correlation based only on simple averages where equal amounts of underpredictions and overpredictions offset one another. Under the "mean absolute deviation" concept, underpredictions (minus values) are treated like overpredictions (positive values), and they are all totaled and averaged. RT Vol. 114 at 108; RT Vol. 118 at 96.

because postcompact wells in Kansas caused streambed percolation to increase, Colorado should not be held responsible.

E. Conclusions.

I conclude that the Durbin approach, using Larson's coefficients, is the best of the several methods presented for determining usable flow. Moreover, I believe this is a reasonable way in which to determine depletions of usable flow.

SECTION XXII

WINTER WATER STORAGE PROGRAM

Most of the final period of the trial, in which the United States played a major role, was devoted to the Winter Water Storage Program ("WWSP"). Kansas' pleadings on this issue focused on its claim that a resolution adopted by the Arkansas River Compact Administration on July 24, 1951 required that any reregulation of the native waters of the Arkansas River be approved by the compact administration. Complaint at 4, ¶ 12; First Amended Complaint at 3-4, ¶ 12. Before trial, however, Colorado filed a motion for partial summary judgment requesting a determination that the compact administration's approval of the WWSP was not legally required. I recommended that Colorado's motion be granted, reserving for trial, however, the issue of whether Stateline flows had actually been materially depleted by the WWSP in violation of the compact. See Part II of this Report. The trial proceeded, therefore, on that reserved factual issue.

A. History of the Winter Water Storage Program.

1. Pueblo Reservoir.

Pueblo Reservoir first appeared as a potential feature of the Fryingpan-Arkansas Project in a 1948 interim report issued by the United States Bureau of Reclamation. Among other project purposes, the report proposed the storage and reregulation in Pueblo Reservoir of the native flows of the Arkansas River, subject to agreements among existing water users. RT Vol. 11 at 126, 128-136; Colo. Exh. 643 at 12. Congress authorized the Fryingpan-Arkansas

Project in 1962. Jt. Exh. 168. Besides the importation of water from the Colorado River watershed west of the Rockies, project purposes included the reregulation of "winter flows of the Arkansas River that are presently diverted for direct-flow use but which, by agreement, could be converted to more beneficial summer use through storage in the Pueblo Reservoir." Jt. Exh. 166 at 32.

In 1964, the Bureau of Reclamation advised the Southeastern Colorado Water Conservancy District[132] that it should begin to develop a program for the storage of winter native flows of the Arkansas River in Pueblo Reservoir. Colo. Exh. 532 at Tab-6 at 6-7. The first winter water storage plan was finalized in 1975 on a three-month trial basis by agreement among the Southeastern Conservancy District and Colorado water users in the Arkansas Valley. RT Vol. 85 at 36, 40-41, 51.

Pueblo Reservoir is owned and operated by the United States, through the Bureau of Reclamation, although other federal and state agencies, including the

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[132] The Southeastern Colorado Water Conservancy District was formed in 1958 under Colorado law, among other reasons, to create an organization with powers acceptable to the Secretary of the Interior to enter into a repayment contract with the United States for the Fryingpan-Arkansas Project. Jt. Exh. 104 at 5; RT Vol. 85 at 13, 15-16. The Southeastern Conservancy District signed a repayment contract in 1965 which provided for winter storage in project reservoirs, and included penalties in the form of increased payments for project water if a winter water storage program were not implemented. Colo. Exh. 532, T-3 at 4, ¶¶ 1(e), 6(c), 11(a).

Corps of Engineers, assist with the operation of the reservoir. The WWSP is administered by the Colorado state engineer, based on operating criteria agreed upon by the participating entities. The United States acknowledges that if Kansas is correct that the winter storage program has caused a material decline in Stateline flows, then "the Program should be adjusted, notwithstanding its benefits to Colorado." U.S. WWSP Br. at 2. Federal legislation authorizing the project provides that Colorado's obligations under the Arkansas River Compact shall not be "altered by any operations of the Fryingpan-Arkansas project." Colo. Exh. 545; Jt. Exh. 168.

2. The WWSP.

Winter flows of the Arkansas River have long been used by Arkansas Valley farmers to compensate for the shortage of irrigation water during the summer. A number of canal companies in Colorado have private reservoirs and appropriate storage rights to store such off-season flows for later use during the summer irrigation season. In addition, farmers in Colorado and western Kansas have diverted water for winter irrigation, that is, diversion of water onto bare fields during the nongrowing season. This practice allowed farmers to take advantage of what otherwise would have been unusable water by increasing the soil moisture for later use by crops during the growing season. However, winter irrigation is affected by weather, and is subject to relatively high rates of evaporation from the wet soil. The Colorado Supreme Court has stated:

> "Winter irrigation is a difficult, less efficient method of irrigation. If possible, a much preferable operation is to store the direct flow winter water and use it later in the year." *Purgatoire River Water Conservancy Dist. v. Kuiper*, 593 P.2d 333, 335 (Colo. 1979).

Winter irrigation below John Martin Reservoir in Colorado generally ended with construction of that reservoir and adoption of the Arkansas River Compact. Under the compact, all winter flows entering the reservoir are stored, subject to the release of river flow not to exceed 100 cfs upon demand by Colorado. Article V-A.

As the Winter Water Storage Program has currently evolved, it operates during a four-month period beginning November 15 and ending March 15 of the following year. Jt. Exh. 22 at 17. The program commenced in 1976, but did not operate during 1977-78. Present participants in the WWSP include all of the major ditch and reservoir companies that have historically diverted from the Arkansas River between Pueblo Reservoir and John Martin Reservoir, except the Otero Ditch Company and the Rocky Ford Canal Company.[133] Jt. Exh. 22 at 22. These participating companies store water during the winter months in Pueblo Reservoir, in John Martin Reservoir,

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[133] The participants are the Amity Mutual Irrigation Company, The Bessemer Irrigating Ditch Company, the Catlin Canal Company, The Colorado Canal Company, The Fort Lyon Canal Company, The High Line Canal Company, The Holbrook Mutual Irrigating Company, The Lake Henry Reservoir Company, The Lake Meredith Reservoir Company, the Las Animas Consolidated Canal Company, The Oxford Farmers Ditch Company, the Riverside Dairy Ditch, and the West Pueblo Ditch.

and in various off-channel reservoirs, and it is then released for use later in the year. RT Vol. 82 at 152. Arkansas River flows during the winter months are relatively small, and almost the entire winter flow of the river above John Martin Reservoir is now diverted and stored in reservoirs. RT Vol. 83 at 76-78. Winter irrigation has essentially been supplanted. Total storage under the program has varied from 94,793 acre-feet in 1978-79 to 216,886 acre-feet in 1986-87. Colo. Exh. 210. There are no limits on the amounts of winter water that can be stored except for the capacities of the reservoirs.

The WWSP, which went through a series of annual changes, was finally approved by a decree of the Colorado Water Court in 1987. RT Vol. 85 at 40, 56-57; Jt. Exh. 22. The decree basically confirms the operating plan that had been in effect since 1983. RT Vol. 86 at 9. Under the plan, the first 100,000 acre-feet of water stored during the winter is allocated among the WWSP participants according to percentages, with 71.2% of the water being allocated to those holding off-channel storage rights, and 28.8% to those participants owning direct-flow rights only. Jt. Exh. 22 at 18-19. The next 2,750 acre-feet of winter stored water above 100,000 acre-feet is allocated to the Amity Mutual Irrigation Company, which may store it in the Great Plains Reservoirs or John Martin Reservoir. The next 356 acre-feet is allocated to the Holbrook Mutual Irrigating Company. Amounts of winter-stored water above 103,106 acre-feet are allocated among the WWSP participants according to a second set of percentages. Jt. Exh. 22 at 19-20. In part, the allocation formulas reflect long-term average diversions by the participants, but in

part they are the result of negotiations among the various companies. RT Vol. 85 at 39-40, 93-96, 121-22.

3. Development and Implementation of the WWSP.

Colorado urges that Kansas, with full knowledge, acquiesced in the development and implementation of the WWSP, and therefore should not now be heard to complain. Colo. Closing WWSP Br. at 64-65. Acquiescence was not specifically raised by Colorado as a defense in its answer, although other equitable defenses were pled. In a case of this kind, however, the issue should not be foreclosed by an overly narrow view of the pleadings.

There is no doubt that Kansas was kept well informed about the development of the WWSP. In 1969, the Southeastern Conservancy District formed a Winter Storage Committee which included representatives of all entities eligible to participate. Chairman of the Board of Trustees of this committee was Charles L. ("Tommy") Thomson. RT Vol. 85 at 30-31. Thomson began to inform Kansas of developments at least as early as 1970 when he reported to the Arkansas River Compact Administration at its annual meeting. RT Vol. 85 at 36-37. He testified that thereafter "It more or less became an annual exercise that I would go down and tell them how we were getting along." *Id.* at 37.

In December of 1975 Thomson reported to a meeting of the compact administration that the program was being inaugurated on a three-month "experimental

basis." Colo. Exh. 532, Tab 13. The compact administration was complimentary, and established a special engineering committee "to report to the Administration at each annual meeting the opinion of that committee of the relationship between Fryingpan-Arkansas Project and the Arkansas River Compact Administration." Colo. Exh. 532, Tab 13. Guy E. Gibson, one of the Kansas members of the compact administration and the Kansas Chief Engineer, Division of Water Resources, was appointed to that committee. RT Vol. 85 at 60. Gibson was also placed on the mailing list for the minutes and other documents from the Southeastern Conservancy District's Winter Storage Committee. Colo. Exh. 532, Tab 11, Tab 25, Tab 26. In short, there is ample evidence that the Kansas representatives "were fully aware of the program and how it had been put together and how it was to be operated, but it was understood by everybody that it was an experimental program and the results were to be evaluated." RT Vol. 85 at 67 (Thomson).

Before approval by the Colorado Water Court in 1987, the WWSP operated on a voluntary basis that required unanimous agreement. Operating plans for the WWSP changed from year to year from 1975 to 1983 when the current formula for allocating water among the participants was adopted. Colo. Closing WWSP Br. at 63. While the program was still being implemented on an interim or trial basis, Kansas expressed concern at the December, 1980 meeting of the compact administration over potential reduction of inflow into John Martin Reservoir resulting from the program. Colo. Exhs. 538, 545. Kansas suggested that a study be made, which was in fact

undertaken by the USGS and completed in February, 1981.

The USGS performed a double-mass curve analysis of streamflow records for 1967-79. The survey found that the data did not indicate that inflow to John Martin Reservoir had been reduced as a result of the storage of winter water in Pueblo Reservoir. Colo. Exh. 538. These results coincided with a computer model analysis made by the USGS in 1975. Using a study period from only 1972 to 1974, and certain assumptions about the nature of the program, the computer analysis predicted an average annual increase of 7,300 acre-feet across the Stateline. Jt. Exh. 88 at 4.24-26. Also in 1981 the Kansas Division of Water Resources reviewed the data and concluded that comparative flows did not show a "reduced flow at the Las Animas gage . . . since operation of Pueblo Reservoir began." Colo. Exh. 539.

Thus, the early and preliminary reviews of winter water storage did not indicate any adverse impact upon Kansas, and there is nothing in the record to suggest any contrary intent. Under the circumstances, I am not persuaded that Kansas should be deemed to have acquiesced in violations of the Arkansas River Compact resulting from the storage of winter water, if indeed material Stateline depletions should prove to be a consequence of that program.

Colorado also argues that Kansas benefited from the storage of winter water in John Martin Reservoir, especially after the 1980 Operating Plan became effective. Having accepted benefits from the WWSP, Kansas should not be permitted, urges Colorado, to claim injury from

the program. Colo. Closing WWSP Br. at pp. 64-66. Storage in John Martin Reservoir was not the major thrust of the WWSP. However, as I concluded in Section XIV, the 1980 Operating Plan provided benefits to both Colorado and Kansas. Consideration was given and received by both states. Kansas did not trade depletions of Stateline flow which are in violation of the Arkansas River Compact in return for benefits under the 1980 Operating Plan.

Kansas also adds that an agreement between the states, without the consent of Congress, cannot alter their respective rights and duties under the compact. *Texas v. New Mexico*, 462 U.S. 554, 564, 567-68 (1983). See also Kan. Exh. 751 (United States Brief in *Oklahoma and Texas v. New Mexico*). However, Colorado responds that the compact has not been unlawfully modified, that adoption of the 1980 plan was well within the powers of the Arkansas River Compact Administration. Be that as-it may, the issue of whether the 1980 Operating Plan alters the compact without the required consent of Congress is not before the Court in this case. The fact is that the 1980 plan is in effect with the consent of both states. The issue now raised is whether Kansas' conduct in relation to the plan should invoke equitable defenses. For the reasons given here and in Section XIV, I have concluded that Kansas should not be barred by equitable considerations from pursuing its claim against the WWSP.

B. Results of the Computer Models.

Both Kansas and Colorado modeled the impact of the Winter Water Storage Program. The United States, on the other hand, reviewed the revised H-I model in depth and

developed the capability to operate it, but did not construct a model of its own.

The depletions to usable flow predicted by the original version of the H-I model are summarized in Kansas Exhibit 112* (12-6-90). For the WWSP, this exhibit shows depletions of 255,000 acre-feet. Comparison H; RT Vol. 88 at 131. In this comparison, it should be noted that Durbin left the switch "on" for the 1980 Operating Plan. The replacement experts, however, took a contrary view and turned that switch "off" in order to isolate the WWSP impacts. RT Vol. 88 at 133-35. The depletion figure of 255,000 acre-feet is the result, in part at least, of the serious coding error found by Colorado in the H-I model. In evaluating the overall persuasiveness of the Kansas case, this original evidence cannot be forgotten or ignored.

Kansas' replacement experts corrected the coding error, made other changes to the model, and then lodged Kansas Exhibit 111**. This exhibit showed the WWSP impacts on usable flow at 44,000 acre-feet. RT Vol. 88 at 132-33. But even that amount turned out to be incorrect. As part of his direct examination, Spronk testified that the input file used in the revised model for the amount of decreed storage available in the Great Plains Reservoirs should have been 223,221 acre-feet instead of 166,892 acre-feet. RT Vo 88 at 141-42. As a result of this additional change, the depletion figure of 44,000 acre-feet calculated by the revised H-I model dropped to 40,000. Kansas then prepared Exhibit 111*** to reflect the corrected figures. Colorado was plainly frustrated over this latest revision, and complained of the prejudice resulting from abruptly finding out that "everything we

did has to be redone." RT Vol. 88 at 143. My disappointment was also evident, although it appeared that Kansas was attempting to get it right. *Id.*

Kansas' final WWSP evidence, presented through its replacement experts, showed total depletions of 53,000 acre-feet, and 40,000 acre-feet of depletions to usable flow. Kan. Exh. 111***.[134] These calculations, however, did not account for return flows from transmountain imports. If these are considered, Spronk testified that depletions to usable flow amount to only 5,000 acre-feet for the entire period of program operation (1976-85). Kan. Exh. 651. Kansas, however, objects to such an offset, arguing that Colorado offset those return flows against pumping, and that no party has suggested that the benefits of imported water be used to reduce WWSP depletions alone. Kan. Comments on Draft Report at 9, 15, 45. In any event, the parties appear to agree that care must be taken not to "double-count" the offset effect of transmountain return flows.

Colorado also presented evidence regarding the WWSP. Helton testified that there was "no discernible impact" on Stateline flows from the WWSP. RT Vol. 115 at 59-60; RT Vol. 86 at 88. Besides the results of Colorado's computer study, he relied on his own work with irrigators and his "observation of what the operations actually were during the winter storage program."[135] RT Vol. 115 at 60.

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[134] This usable flow figure is derived from the Spronk analysis. If Durbin's methodology with Larson's coefficients are used, the result is 27,000 acre-feet. Colo. Exh. 975, Comparison 3.

[135] Helton was one of Colorado's two representatives on the special engineering committee formed by the compact

Colorado used its water budget to analyze the effects of the WWSP under a study called a "What-if 1" comparison. Colo. Exh. 134* at 8.1. However, unlike Kansas, Colorado did not analyze the WWSP for the years when it was actually operating. Instead, Colorado superimposed the program on the historic period of 1950-75 and 1978, that is, during the years when the program was *not* in place. Colorado did not think it was possible to predict reliably what the winter diversions would have been after 1976 under an assumption that the program was not in operation. Even so, Kansas says that the Colorado analysis is "simply for the wrong period."[136] Kan. Opening Br. at 97.

I cannot say that it was legally wrong for Colorado to simulate the operation of the WWSP over an historic period.[137] However, I believe it is more appropriate to

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administration in 1975 to review and analyze the program, and to report back to the administration. Colo. Exh. 532, Tab 13.

[136] Kansas was also critical of a number of incorrect assumptions in Colorado's analysis which had the effect of overstating evaporation or consumptive use under historic winter irrigation practices, and thus understating the impact of the WWSP. See, e.g., failure to cut off winter soil evaporation at temperatures below freezing, RT Vol. 103 at 59; assuming that winter irrigation water was applied to all of the lands of the WWSP participants, RT Vol. 114 at 149; and underestimating tailwater returns during the winter months, e.g., winter return flows from the Fort Lyon Canal were calculated to be zero for all years from 1950 through 1984. Kan. Exh. 735, RT Vol. 134 at 110-11. Moreover, the Colorado analysis assumes there were no depletions above the Las Animas gage. RT Vol. 116 at 131-32.

[137] This was in fact the technique used by the Bureau of Reclamation in evaluating the potential impact of the Trinidad Project. Studies were done in 1961-64 using the period of

evaluate the actual operations of the WWSP. There is a continuing obligation to implement the program in accord with the Arkansas River Compact, and in the future it will become increasingly important to determine compliance on a current basis. To conclude that the program would not have caused Stateline depletions if it had been operated under 1950-75 conditions does not necessarily establish that future operations, under perhaps quite different hydrologic and cultural conditions, will not cause depletions.

However, the Colorado water budget analysis does show some limited depletions, in excess of 9,000 acre-feet for the 27 year period studied, or about 354 acre-feet per year on average. Calculated from Colo. Exh. 134* at 8.1, Col. 16; RT Vol. 134 at 113. Apparently the 9,000 acre-feet figure would represent depletions of total flow as opposed to usable flow, although I found no specific evidence on this point.[138]

C. Position of the United States.

Initially, the United States questions whether Kansas' expert testimony based upon the revised H-I model satisfies threshold standards of reliability, citing the Supreme Court's recent decision in *Daubert, et al. v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. ___, 125 L.Ed.2d 469 (1993).

1925-57 to simulate operation of the proposed reservoir. Jt. Exh. 24a, 24b. Of course, these were preproject studies. There was no opportunity in 1961-64 to analyze actual operations.

[138] Kansas understood that this figure related to total, not to usable flows. RT Vol. 142 at 56.

I note that the decision is limited to the "scientific" portion of Rule 702 although the rule also applies to "technical, or other specialized knowledge." Moreover, the discussion is seemingly aimed at jury cases. Nonetheless, if the decision, including the "general observations" of the Court, does apply to all of the expert testimony in this case, I believe that *admissibility* requirements have been met. The real issue here, however, is whether Kansas' expert testimony, based as it is largely upon the results of the revised H-I model, is sufficiently persuasive to carry the burden of proof with respect to the WWSP. For reasons later discussed, I do not believe that it is.

The United States intervened in the case well after preparations for trial by the two states had begun. At the outset, the United States did not have access to the new data being developed by experts for the states, e.g., amounts of pumping, diversions, irrigated acreage, storage data, and consumptive use by phreatophytes. RT Vol. 119 at 115. The United States' experts attempted to make a water balance of the surface and groundwater system of the Arkansas River in Colorado. However, because of the lack of data they could not determine from that analysis whether the WWSP had an impact on Stateline flows, "either positive or negative." RT Vol. 119 at 113. Nor did they believe, with the current data then available, that they could develop their own model. *Id.* at 120. Instead, the United States' experts concentrated their attention on

Kansas' revised H-I model.[139] No similar effort was made to analyze the Colorado water budget.

The two principal experts for the United States both testified that they did not know whether the WWSP had any impact on Stateline flows, "plus or minus." RT Vol. 120 at 78. Moreover, given the relatively small magnitude of the claimed impacts of the WWSP, and the present state of knowledge, Mr. Finlayson did not believe that a model could be constructed "to determine that impact with a reasonable degree of accuracy." RT Vol. 120 at 74. The basic problem, he testified, lies in attempting to take a single change in the use of a relatively small amount of water, and to route that change from Pueblo to the Stateline. RT Vol. 120 at 23.

However, the Deputy Assistant Commissioner, Resources Management, of the Bureau of Reclamation expressed a different view.[140] Concerning the WWSP, he testified that the Bureau recognizes an obligation not to cause a material depletion in Stateline flows, and that in his opinion the Bureau has been meeting that obligation. RT Vol. 122 at 52. On questioning from me, however, it

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[139] These expert witnesses were Donald J. Finlayson and Charles W. Binder. Mr. Finlayson served with California Department of Water Resources for some 30 years, retiring as Chief of its Planning Branch. His experience and qualifications are set forth in U.S. Exhibit 47*. Mr. Binder holds a 1981 master's degree in civil engineering from Colorado State University. He has worked for Simons, Li & Associates and Spronk Water Engineers. Since 1989 he has been employed by David Keith Todd in Berkeley, California. His qualifications appear in U.S. Exhibit 46.

[140] Raymond H. Willms, located in Denver, Colo.

became apparent that he was essentially relying on assurances from Colorado. "They have indicated to us that they operate it [WWSP] without impairing or causing a material depletion of the compact." RT Vol. 122 at 53. While the Bureau had not seen any indication of impairment, Willms acknowledged that the Bureau itself had not made any independent studies and was going ahead with its part of the program on the assumption that it was being properly administered by Colorado, RT Vol. 122 at 53. It should be noted that the federal facilities are only part of the WWSP; that Willms testified that there cannot be "two masters" here; and that the Bureau generally leaves the administration of water rights to the states. RT Vol. 122 at 19-20.

As part of the post-trial briefing process, I inquired of counsel concerning the United States' position on WWSP compliance with the compact – that is, whether the program is indeed in compliance or the United States does not know. Counsel for the United States replied, "Under our interpretation, the WWSP is in compliance with the Compact, which specifically provides for new beneficial development such as the WWSP." Aug. 24, 1993 letter at 3. Noting that such new development is obligated not to cause material depletions, counsel nonetheless went on to state that the compact "does not require affirmative proof of 'no depletion' before development can go forward." *Id.* Rather, the United States concluded, "beneficial developments with no known or obvious adverse impacts seem to be permitted under the Compact unless shown to have caused disallowed depletions." *Id.* (It should be recalled

that the United States would also require Kansas to establish any compact violation by "clear and convincing" evidence.)

I am not persuaded that the United States should have so little responsibility. Pueblo Reservoir is a major storage facility, and to alter the regime of the Arkansas River by storing winter flows is not a trivial change. The compact is a law of the United States, binding on the Bureau of Reclamation as well as on the States of Kansas and Colorado. *Texas v. New Mexico*, 462 U.S. 554, 564, 77 L.Ed.2d 1, 103 S.Ct. 2558 (1983). In a development of this kind, the United States should not operate the project or participate in its operation, without a good faith belief, based on whatever data or studies may be needed, that the United States is acting in full compliance with the law. This is not to suggest that United States' officials have not been acting in good faith. But their beliefs appear to rest primarily on assurances from Colorado, without independent review or confirmation.

D. United States Critique of the Results of the Revised H-I Model [WWSP].

The central thrust of the United States' case is that the revised H-I model is not sufficiently reliable or refined to prove Stateline depletions from the WWSP. According to Kansas' own evidence total depletions to usable flow over a nine-year period of operations (1976-85, except for 1978) amount to 40,000 acre-feet. If the Court accepts my recommendation on the methodology to be used for the calculation of usable flows, then the 40,000 acre-feet amount is reduced to 27,200 acre-feet.

Colo. Exh. 975. If accretions are considered, the depletions are eliminated entirely. *Id.* The essence of the United States' position is that the ranges of error or uncertainty in the H-I model results, whether considered on an annual or monthly basis, are far greater than the depletions sought to be calculated. A shortage derived from the model results may well reflect only model error, not the real impact of the WWSP. As one Colorado expert put it, "the error is simply a lot bigger than the effect we are trying to find." RT Vol. 133 at 24. The United States is not unsympathetic to the fact that this is "an extremely complex modeling problem," but such difficulty only stiffens the need for reliability. U.S. WWSP Br. at 6.

The United States introduced a series of exhibits comparing the Stateline flows predicted by the revised H-I model with those actually observed. This was done on both an annual and monthly basis, and certain exhibits excluded the extraordinarily high flood flows of several "outlier" months; these last exhibits are the ones I have used for comparative purposes. Observed Stateline flows are tabulated in U.S. Exhibit 24*, predicted flows in U.S. Exhibit 25*, and the differences in U.S. Exhibit 26*. In 6 of the 10 years in which the WWSP was simulated, the error between predicted and observed flows exceeded 30 percent. The largest overprediction was 31,416 acre-feet (for 1979), while the greatest underprediction was 19,526 acre-feet (for 1978). In the three years in which the error was less than 10 percent, the magnitude of the difference in flows still averaged 12,251 acre-feet.

The United States contrasts these figures with average annual net depletions from the WWSP of only 1538 acre-feet. U.S. WWSP Br. at 28. However, this is not the

amount of Kansas' claim since this depletion estimate is the result of two very large months of accretions.[141] When these accretions for these months are removed, Kansas claimed depletions from the WWSP average 4,739 acre-feet per year. U.S. Exh. 18; RT Vol. 118 at 69-70.

The United States' experts also presented an "error analysis" of the predicted versus observed Stateline flows on a monthly basis. U.S. Exh. 29. For the period of time before the WWSP was in operation (1950-75), monthly Stateline flows averaged over 10,500 acre-feet, excluding the outlier months. U.S. Exh. 24*; U.S. WWSP Br. at 26. During this time, the absolute average error in the monthly model predictions was 3,642 acre-feet.[142] U.S. Exh. 29. For the period of 1976-85 when the WWSP was in place, this average monthly error was 3,793 acre-feet, and for 1980-85 it increased to 4,566 acre-feet. *Id*. Monthly predicted and observed flows are shown on U.S. Exhibit 36, together with the monthly impact of the WWSP as calculated by the revised H-I model. For the 1976-85 period, predicted flows exceeded actual flows by an average (not absolute average) of 2,084 acre-feet per month. RT Vol. 118 at 85. This can be contrasted with average predicted depletions of 475 acre-feet per month, or 128 acre-feet if accretions are considered. *Id*.

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[141] 17,416 acre-feet in May, 1985 and 13,889 acre-feet in June, 1985. U.S. Exh. 18; RT Vol. 118 at 67-71.

[142] As used by the United States, the concept of absolute average error sums up the actual amount of error that occurred for each month, rather than a long-term average which allows positive and negative values to cancel out. Helton used the term "mean monthly absolute deviation" to describe the same concept.

Mr. Charles W. Binder, one of the United States experts, acknowledged that during the pre-WWSP period (1951-75) the revised H-I model had "virtually no error" when considering long-term, average annual results.[143] *Id*. at 85-86. However, during the WWSP years, the United States evidence showed that the Kansas model overpredicted Stateline flows by an average of some 13,507 acre-feet a year. U.S. Exh. 26*. Binder testified that this change indicates errors in the model that do not allow it to predict accurately during the period of the WWSP operation. RT Vol. 118 at 72, 85-86, 88.

Kansas argues strongly that it is a "fundamental misconception" to evaluate the accuracy of the revised H-I model by comparing predicted to observed flows. RT Vol. 142 at 25-26, 55. To be sure, the model was calibrated against actual, historic flows. Yet, Stateline depletions are not determined on that basis, but rather by taking the difference between two model runs that reflect different institutional conditions. As Mr. Larson testified, this permits errors in data or assumptions to cancel out since they are common to both runs. RT Vol. 99 at 29-30; see also RT Vol. 101 at 19-20, 22, 25; RT Vol. 118 at 100. The model has always been viewed as a better predictor of *changes* in Stateline flows than as a predictor of actual Stateline flows. RT Vol. 44 at 91-92; RT Vol. 51 at 72. However, in assessing the WWSP impacts, Kansas compared two hypothetical situations without a common base. Kansas did not model the real WWSP, as it has been operating. Under those circumstances I do not find it

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[143] The model underpredicted by about 2,500 acre-feet per year. U.S. Exh. 26*.

inappropriate to consider actual flows and conditions in evaluating the model results.

To prove that the WWSP caused a material decline in Stateline flows, Kansas computed the difference between flows from two model runs, each of which has the 1980 Operating Plan simulation removed. These are the WWSP run (HHCH), and the winter irrigation run when the WWSP was not simulated (HCCH). Kansas argues that it was necessary to turn the switch "off" on the 1980 Operating Plan because the plan and the WWSP are so closely tied together; if the model run does not include the WWSP, it is said that operation of the 1980 Operating Plan should not be simulated either. In effect, experts for Kansas made the engineering judgment that the 1980 plan would not continue without the WWSP. As a result, there is no model run that reflects actual historical conditions. RT Vol. 142 at 90. In simulating the WWSP, Kansas does not include winter storage in John Martin Reservoir, although Amity, Las Animas and Fort Lyon actually stored winter water in that reservoir under the WWSP.

Both the United States and Colorado also point out that certain problems present in the WWSP runs will not cancel out because the errors are not parallel. For example, one of the principal factual issues concerns the amount of evaporation occurring from winter irrigation. The United States and Colorado both claim that Kansas has underestimated this figure. To the extent this is true, return flows are increased and Stateline flows become larger. However, if indeed Stateline flows are in error, there would be no comparable overstatement of streamflows in the companion WWSP run because in that run winter water is stored, and not subjected to evaporation

from bare fields. The issue of winter soil evaporation is discussed more fully in the following subsection.

The H-I model also overpredicts the amount of water actually put into storage by about 141,500 acre-feet. Colo. Exh. 894. Colorado calls this a "real error" that does not "wash out against anything." RT Vol. 143 at 62-63. In the comparison simulation, that is in the model run without the WWSP being operated, there is no comparable storage figure. Instead, it is assumed that winter flows are applied directly to bare fields for irrigation.

The United States also joins in many of the general criticisms of the revised H-I model made by Colorado.[144]

E. Accretions from the WWSP.

Finally, both the United States and Colorado urge that accretions must be considered when evaluating the impacts of the WWSP. If this is done in conjunction with the usable flow analysis recommended in Section XXI of this Report, the revised H-I model reduces depletions to 2,200 acre-feet for the whole nine year program, or calculates an actual increase in Stateline flows, depending

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[144] Besides winter evaporation issues, the United States complains about the use of the WTADD factor to limit winter diversions; the use of a 10% tailwater factor that is too high; the diversion reduction factor; the artificial reduction of canal capacities; assumptions re Kansas demands affecting releases from the conservation pool; the assumption of linearity of the groundwater model; failure to match monthly diversions; overprediction of off-channel storage during the WWSP simulation; and departures from actual timing and amounts in simulating storage in John Martin Reservoir.

upon how the institutional switches are set for the 1980 Operating Plan. Colo. Exh. 975, Comparisons 3, 7. Kansas objects, noting that of the 37,000 acre-feet of accretions occurring during the 1976-85 period, 31,000 acre-feet occur in two months in 1985, right at the end of the period. Kan. Exh. 565*** at 8. However, the timing of any accretions (as well as depletions) becomes a product of the assumptions and parameters used in the modeling effort. It seems likely that a reservoir storage program could well provide some usable accretions that would mitigate depletions.

The evidence shows that in seven of the nine years during which the WWSP operated, the H-I model put more water into storage in John Martin Reservoir than actually occurred. U.S. Exh. 8; Colo. Exh. 899. As a result of this artificial storage buildup, the model calculated that John Martin Reservoir filled in 1985, finally producing a model spill of 255,000 acre-feet. Colo. Exh. 980. An actual spill did occur in that year, but it amounted to only 87,000 acre-feet. *Id*. The United States and Colorado thus argue that the H-I model held water in storage that in truth moved downstream over the years to add to Stateline flows. However, in terms of model results, when the stored water was spilled during two months in 1985, the flows show up as "accretions." And Kansas disregards such flows as not being usable or timely if they are to be used to reduce depletions that occurred earlier in the WWSP period. There is not sufficient evidence to determine what the impact on Stateline flows would have been if the H-I model had more closely corresponded to actual storage in John Martin Reservoir and to actual releases.

However, there seems to be merit in Colorado's argument, with respect to the WWSP and accretions, that the H-I model has created "false depletions." RT Vol. 142 at 80.

F. Winter Irrigation Evaporation.

Whether the WWSP does result in Stateline depletions depends on a comparison of consumptive use under the program with prior winter irrigation practices. Kansas maintains that storing the winter river flows in reservoirs, and then applying that water to irrigated crops in the summer, uses more water than simply irrigating bare fields in the winter. On first impression, this would seem to be true. Indeed, that was even Schroeder's reaction, that is, that the program "would seem to deplete the state line flow." RT Vol. 111 at 143-45. However, the issue is much more complex than first appears, and a great deal of highly technical evidence was introduced on the subject. The issue turns largely on the amount of evaporation from bare soil that is assumed during the period when winter irrigation was practiced.

When water is applied to bare soil in the winter, the water at or near the soil surface evaporates at a high rate. The United States' expert testified that the evaporation rate from wet soil is at or near the rate of lake evaporation. RT Vol. 136 at 52-53. Water that is not evaporated is stored in the soil profile and held there against gravity until the water-holding capacity is exceeded. The excess then percolates down to the next layer of soil or into deep percolation. *Id*. at 20-34. The water retained in the soil

profile is either evaporated at a slower rate, or is available for use by the crop during the next growing season. *Id*. at 47-52; RT Vol. 114 at 147-155. Of course, there is also a certain amount of tailwater runoff that reaches the river from such winter irrigation. The amounts of water that are evaporated, or retained in the soil profile for crop consumption, or percolate into the groundwater, vary with the season, soil, weather, and amount and timing of applied irrigation water.

The physical process of soil evaporation involves two separate phases or "stages." The first phase occurs when the top profile of soil, from four to six inches, is wet, and the rate of evaporation is limited by the evaporative capacity of the air. Colo. Exh. 659. During the second stage, after the top of the soil has dried out, evaporation still continues but at a slower rate. RT Vol. 136 at 74; U.S. Exh. 61 at 48. However, soil evaporation from water applied to bare fields in the winter is not well documented in the literature. Colo. Exh. 659. Much of the available data relate only to soil evaporation during the growing season.

For use in the development of the H-I model, Kansas' experts prepared a memorandum reviewing the available information about winter evaporation. Colo. Exh. 659. As a result, Kansas adopted a modified Blaney-Criddle equation for the determination of winter soil evaporation. Book testified that he knew of four prior studies along the Arkansas River where this methodology had been used to determine winter soil evaporation. RT Vol. 126 at 92-96. The engineering data used in one of these studies involving the Kessee ditch had been submitted to and approved by the engineering committee of the Arkansas

River Compact Administration. *Id*. at 92-93. In its application of the Blaney-Criddle equation in the H-I model, Kansas applied a coefficient of .2 for potential evapotranspiration (PET). From all the data available, Book believed that this was a reasonable figure. RT Vol. 126 at 105.

Colorado, on the other hand, employed a formula known as the Ritchie equation for the determination of winter soil evaporation. This methodology was strongly supported by the United States; indeed, the United States' expert testified that not only was the Ritchie formula by far "the best way of calculating soil evaporation," but that other methods were "not even appropriate."[145] RT Vol. 136 at 96. Colorado's use of the Ritchie equation produces higher amounts of winter soil evaporation than the Kansas analysis. The difference is approximately 15%, or an average of about 12,000 acre-feet annually for the 1950-85 period. RT Vol. 125 at 74-75; RT Vol. 126 at 133, 146-47; Colo. Exh. 862. Of course, higher estimates of evaporation from winter irrigation reduce the historic contributions to the river from such winter diversions, and lessen any depletions under the WWSP.

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[145] Testimony of Dr. Robert D. Burman, Professor Emeritus of Agricultural Engineering at the University of Wyoming. His resume is U.S. Exh. 60. Dr. Burman chaired the American Society of Civil Engineers' Committee on Irrigation Water Requirements for over ten years, and is the co-author of the ASCE publication, "Evapotranspiration and Irrigation Water Requirements."

Colorado argued that the PET used in the revised H-I model acted as a ceiling and did not allow evaporation to increase with larger applications of irrigation water. RT Vol. 138 at 58. Schroeder, therefore, made a change to the revised H-I model. He removed the PET cap so that evaporation was calculated in a manner similar to that in Colorado's water budget. RT Vol. 138 at 64, 67; RT Vol. 139 at 65. The result of this one change essentially cut the depletions calculated by the revised H-I model in half.[146] Colo. Exh. 1012, Comparison 4. However, Kansas objected that such a change was not appropriate, claiming that the H-I model is a "one-layer" model. To remove the PET cap allows access to the entire soil moisture reservoir. RT Vol. 125 at 76. An increase in the PET results in a like amount of actual consumption in the Kansas model. *Id.* This is unlike the Colorado "two-layer" model, which can isolate part of the soil moisture, not allowing it to evaporate. *Id.* Schroeder also acknowledged that he did not recalibrate the revised H-I model after his change. RT Vol. 139 at 64. Thus, while Schroeder's results may not be appropriate or reliable, they do emphasize the importance of accurate winter evaporation data in evaluating the WWSP.

On surrebuttal, the United States called Dr. Burman as an expert witness on the evaporation issue. His principal points were that the PET coefficient used by Kansas was too low, and that Kansas should have employed the Ritchie equation instead of the modified Blaney-Criddle

[146] Total depletions from the WWSP were reduced from 53,440 acre-feet to 25,532 acre-feet. Similar reductions occurred in depletions of usable flow.

methodology.[147] He pointed out that the Kansas approach cannot be adjusted to reflect the different number of irrigation applications or "wettings." RT Vol. 136 at 98. The H-I model recognizes only average wettings, with the result that it does not properly simulate stage one events and underestimates actual evaporation. RT Vol. 137 at 9-10. The Ritchie equation, on the other hand, addresses both stages of evaporation and the wetting frequency. However, the Ritchie equation requires the use of a two-layer model. RT Vol. 126 at 97-98, 108. While the Ritchie equation may be more refined, and possibly more accurate, it cannot be used in a one-layer model like the revised H-I model. *Id.*

It is not clear, however, that reasonable results can be obtained only through the use of the Ritchie equation. While Dr. Burman is described by counsel for the United States as "one of the most knowledgeable experts in the world in the physical processes that govern the consumption of irrigation water," he knew of no instance, apart from this case, where the Ritchie equation had been used to model the evaporation of winter irrigation water. RT Vol. 137 at 52, 60. He himself had never applied the Ritchie equation to winter soil evaporation. RT Vol. 135 at 98. Apart from work in another current case, he had never developed a computer program to model soil moisture accounting. *Id.* at 90, 96. Indeed, he had never made a study of evaporation from bare soil. RT Vol. 137 at 52-53; RT Vol. 135 at 97. Moreover, he acknowledged that

[147] Another U.S. expert, however, appears to have used Blaney-Criddle in the early stages of his investigation. RT Vol. 119 at 117.

the Ritchie equation should be applied on a daily timestep, and that the required records of lands on which water was used are not available on a daily basis. RT Vol. 137 at 52-53, 58-59. He had no opinion on what the proper value for PET should be, although in his view the Kansas modeling approach did not lend itself to an appropriate PET value. RT Vol. 137 at 12.

The weight of his testimony was subject to further question by the fact that the form of the Ritchie equation published in his 1990 book was incorrect.[148] RT Vol. 137 at 22-26, 30, 32; Kan. Exh. 699. This might not be a worthy consideration (counsel for the United States says the error was a typographical mistake only) except for the persistent cross-examination that was required to get him to appreciate the error. Moreover, his testimony on the stage one evaporation portion of the equation was far from clear. His own calculations applying the Ritchie formula omitted a reduction called for by the equation. RT Vol. 137 at 14-22, 102-04. He used "straight lake evaporation" as opposed to applying a 10 percent reduction included within the equation. *Id.* at 103.

In the final analysis, modeling winter evaporation depends not only upon the equation used but also on the amounts and frequency of the irrigation applications, and weather conditions at those times. However, that determination need not be made in order to decide the present WWSP claim. I have concluded that the depletions shown

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[148] The equation is 4.11 on page 49 of U.S. Exh. 61. This is commonly known as Manual 70, published by American Society of Civil Engineers, entitled *Evapotranspiration and Irrigation Water Requirements.*

by the Kansas model are well within the model's range of error. One cannot be sure whether impact or error is being shown. Nonetheless, it is evident that winter evaporation is an important factor in evaluating the WWSP, and one would hope that appropriate field studies could eventually be made to provide more reliable evidence on this issue.

G. Conclusions re WWSP.

I conclude that Kansas is not barred by equitable considerations from pursuing a claim under the compact against the operation of the Winter Water Storage Program. However, even if the standard of proof is a preponderance of the evidence, I find that Kansas has not proved that the WWSP has caused material Stateline depletions. Kansas' case has not been helped by its own contradictions in quantifying impacts to usable flow – ranging during this trial from 255,000 acre-feet initially, to 44,000, to 40,000; nor by the fact that depletions are essentially eliminated if accretions are taken into account. This is not to say that the WWSP has not adversely impacted Stateline flows, but rather that Kansas has failed to prove that it has.

SECTION XXIII

RECOMMENDATIONS

The trial in this case was bifurcated into a liability and a remedy phase. This Report presents my recommendations on the issue of liability with respect to the various claims of the states.

The major issue in the trial, and in Part I of this Report, is whether postcompact well pumping in Colorado has violated Article IV-D of the Arkansas River Compact. I recommend that the Court find that such a violation has occurred, and that Kansas prevail on this issue. With respect to Kansas' additional claim concerning the Winter Water Storage Program, I recommend that the Court find that Kansas has failed to prove that operation of the program has violated the compact.

Four other liability issues were decided on motion, either before the trial began or after evidence was received. With respect to these issues, I recommend that the following decisions be confirmed:

(a) Granting Colorado's motion for partial summary judgment on the legal issue of whether the Winter Water Storage Program in Pueblo Reservoir was subject to the approval of the Arkansas River Compact Administration. This decision is Part II of this Report.

(b) Granting Colorado's motion to dismiss the Kansas claim arising from the operation of Trinidad Reservoir. This decision is Part III of this Report.

(c) Granting Kansas' motion to dismiss Colorado's "Lake McKinney Counterclaim." This decision is Part IV of this Report.

(d) Granting Kansas' motion to dismiss Colorado's "Well Counterclaim." This decision is Part V of this Report.

If the Court finds, in accord with this Report or otherwise, that the Arkansas River Compact has been violated, then I recommend that the case be remanded for further evidence and conclusion of the remedy phase of the trial.

DATED: July 1994

Respectfully Submitted,

ARTHUR L. LITTLEWORTH,
Special Master

No. 105, ORIGINAL

In The

Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

and

UNITED STATES OF AMERICA,

Defendant-Intervenor.

ARTHUR L. LITTLEWORTH, Special Master

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REPORT – PART II

REPORT OF SPECIAL MASTER RE
WINTER STORAGE MOTIONS

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant.	)	No. 105, Original October Term, 1985

REPORT OF SPECIAL MASTER RE WINTER STORAGE MOTIONS

(Filed Sept. 15, 1989)

Colorado has filed several motions concerning the so-called winter storage program. These consist of a Motion for Partial Summary Judgment on the 1951 Resolution, a Motion to Stay Review of Kansas' Claim of Injury from the Winter Storage Program, and Motions to Strike Portions of the Affidavits of Douglas R. Littlefield, Ph.D. and Carl E. Bentrup filed on behalf of Kansas. In support of these motions, Colorado has submitted several affidavits and four large volumes of accompanying documents. Many date back to the events leading up to the adoption of the Arkansas River Compact in 1949. The United States, now having intervened in this case, also filed a brief in support of Colorado's Motion for Partial Summary Judgment. Kansas, in reply, filed three volumes of additional documents, together with the Littlefield and Bentrup Affidavits. All parties agreed that these motions could be decided by the Special Master without oral argument.

Colorado's Motion for Partial Summary Judgment

In its Complaint Kansas contends, among other allegations, that any reregulation of the native waters of the Arkansas River must be approved by the Compact Administration, pursuant to a Resolution adopted by the Compact Administration on July 24, 1951 (hereinafter the "1951 Resolution"). Colorado seeks a determination through its Motion for Partial Summary Judgment that such approval by the Compact Administration is not legally required.

The issues arise out of the winter storage program in Pueblo Reservoir, a part of the Fryingpan-Arkansas Project authorized by Congress in 1962. 43 U.S.C. §§ 616-616f (1962). Pueblo Dam is located on the mainstem of the Arkansas River approximately six miles west of the City of Pueblo, Colorado, and is owned and operated by the United States, through the Bureau of Reclamation. The Fryingpan-Arkansas Project brings water from the Colorado River Basin west of the Continental Divide into the Arkansas River Valley of Eastern Colorado, storing such water in Pueblo Reservoir. In addition, Pueblo Reservoir provides storage space for the reregulation of private water rights. This reregulation involves the storage of "native" waters of the Arkansas River which were historically diverted by water users in Colorado for irrigation use during the winter months, but which now are stored for later release during the months of peak crop demand (hereinafter the "winter storage program").

The 1951 Resolution consisted of certain "comments and recommendations" made by the Compact Administration to the Governors of Colorado and Kansas with

respect to the then proposed Fryingpan-Arkansas Project.[1] The Resolution sets out the Compact Administration's understanding of the proposed project, namely, that approximately 70,000 acre-feet of water a year would be imported from the Colorado River Basin into the Arkansas River Basin for supplemental irrigation and domestic water supplies in Colorado; and further, that the project would involve the reregulation of native waters of the Arkansas River. Noting its concern over the reregulation of native waters, the Compact Administration recommended to the Governors of Colorado and Kansas, "and expressed as a policy of the Arkansas River Compact Administration," that the proposed Federal project be approved, but on the condition that there would be no reregulation of native waters of the Arkansas River until a plan therefor had been submitted to, "and approved by," the Arkansas River Compact Administration and the affected water users. The full text of the 1951 Resolution is attached to this Report.

Colorado's argument on its Motion for Partial Summary Judgment begins with an analysis of the Arkansas River Compact, and the powers granted therein to the Compact Administration. The Compact was approved by Congress in 1949, and is now a law of the United States. 63 Stat. 145 (1949); *See Texas v. New Mexico*, 462 U.S. 554, 564 (1983); *Cuyler v. Adams*, 449 U.S. 433, 438 (1981). The

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[1] At that time the project was known as the "Gunnison-Arkansas Project, Roaring Fork Diversion." The Gunnison-Arkansas Project was ultimately scaled down, and the Roaring Fork Diversion Unit was renamed the Fryingpan-Arkansas Project, and authorized for construction in 1962.

Compact Administration can exercise only those powers provided in the Compact ratified by Kansas and Colorado, and approved by Congress under the Compact Clause of the United States Constitution. The Compact Administration cannot, by its own action, expand its powers; nor can a court order relief inconsistent with the express terms of the Compact. *Texas v. New Mexico*, 462 U.S. 554, 564 (1983); *West Virginia ex rel. Dyer v. Sims*, 341 U.S. 22, 28 (1951).

Colorado maintains that the Compact Administration never had, and was never intended to have, the power to require its approval of any reregulation of the native waters of the Arkansas River. Specifically at issue now is the winter storage program in Pueblo Reservoir, a Federal facility. The practical question is whether the winter storage program can be implemented without the prior approval of the Compact Administration. The United States supports Colorado in the view that the express language of the Compact demonstrates that it was not intended to impede the implementation of Federal projects. Presumably, however, both Colorado and the United States agree that the Compact Administration has the authority to *investigate* any impact that the winter storage program might have on Kansas' entitlement under the Compact. Moreover, any future development or program must be consistent with the substantive requirement in the Compact that the waters of the Arkansas River ". . . shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas. . . ." Arkansas River Compact, Ch. 79, 59 Stat. 53, Article IV-D.

Colorado points initially to Article VI-A(2), which provides:

> "Except as otherwise provided, nothing in this Compact shall be construed as supplanting the administration by Colorado of the rights of appropriators of waters of the Arkansas river in said State as decreed to said appropriators by the courts of Colorado . . . nor as curtailing the diversion and use for irrigation and other beneficial purposes in Colorado of the waters of the Arkansas River."

Colorado argues that any requirement that the Compact Administration must approve the reregulation of native waters would, in fact, supplant Colorado's water rights administration in contravention of this Article.

Article IV-D of the Compact is also cited in support of Colorado's motion. It provides:

> "This Compact is not intended to impede or prevent future beneficial development of the Arkansas River Basin in Colorado and Kansas by Federal or State agencies, by private enterprise, or by combinations thereof, which may involve the construction of dams, reservoirs and other works for the purposes of water utilization and control, as well as the improved or prolonged functioning of existing works: Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction."

Finally, Colorado relies on Article VIII-H, arguing that the enforcement authority of the Compact Administration is limited to making investigations, findings, and recommendations; and that the Administration was not delegated authority to enforce the proviso of Article IV-D by requiring its prior approval of future development or construction. Article VIII-H provides:

> "Violation of any of the provisions of this Compact or other actions prejudicial thereto which come to the attention of the Administration shall be promptly investigated by it. When deemed advisable as the result of such investigation, the Administration may report its findings and recommendations to the State official who is charged with the administration of the water rights for appropriate action, it being the intent of this Compact that enforcement of its terms shall be accomplished in general through the State agencies and officials charged with the administration of water rights."

Kansas properly points out that this provision deals only with a "violation" of the Compact, and it is the position of Kansas that the Administration has the right of approval in order to *prevent* Compact violations. Nonetheless, Article VIII-H, coupled with the requirement that any action by the Compact Administration be approved by the representatives of both States, underscores the limited direct enforcement powers of the Compact Administration.[2]

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[2] The history of the Compact negotiations shows a successive weakening of the powers originally proposed for the Compact Administration. For example, early proposals would have made Administration findings of fact conclusive in subsequent court proceedings, and would also have allowed the Administration to institute appropriate legal action in the event the States failed to act. Record, Colorado-Kansas Arkansas River Compact Commission at 15-25; 15-46-47. Both of these powers were finally dropped. Record, *id.* at 15-58; 17-83-84. Kansas says that Article VIII was "gutted" of any real enforcement provisions. Kansas' Response to Colorado's Motion for Partial Summary Judgment at 22.

Viewing all of these provisions, the United States concludes:

> "Taken together, these Compact Provisions confirm that the Compact parties did not give the Compact Administration the authority to block the implementation of programs like the winter storage program by withholding its approval of the necessary operating principles. Instead, the Compact clearly contemplates that the Compact Administration will play only an investigatory role, to determine whether projects like the winter storage program at Pueblo Reservoir, comply with the provisions of the Compact." Response of the United States to Colorado's Motion for Partial Summary Judgment and Colorado's Motion to Stay at 15.

All parties, however, go beyond the provisions of the Compact itself. Both Colorado and Kansas review the extensive documentary record of the negotiations leading to final approval of the Arkansas River Compact. The authority to negotiate such a Compact was granted by Congress in 1945, subject to the condition that a person appointed by the President participate as a representative of the United States. Arkansas River Compact, Ch. 79, 59 Stat. 53. The United States Representative was General

Hans Kramer, U.S. Army Corps of Engineers, (Ret.), and he was elected Chairman of the negotiating Commission. Both States rely upon such documentary evidence to help establish intent. When the interpretation of a Compact is at issue, the record of the negotiations may be used to ascertain the meaning intended by the parties. *See Texas v. New Mexico*, 462 U.S. 554, 568 n. 14 (1983); *Arizona v. California*, 292 U.S. 341, 359-60 (1934).

Although the Fryingpan-Arkansas Project was not approved by Congress until 1962, both States acknowledge that the forerunner of the Project (under the name of the Gunnison-Arkansas Project) was being investigated at the same time that the Arkansas River Compact was being negotiated. Colorado's Brief at 37; Kansas' Response at 11. Indeed, the Project was specifically discussed during those negotiations.

The Special Master has studied the voluminous record of the Compact negotiations submitted by both States, and concludes that the record does not support Kansas' claim that the Compact negotiators intended to vest the Compact Administration with ". . . the authority to approve or disapprove any future federal development that might undermine the status quo as established by the Compact." Kansas' Response at 34. Indeed, specific reference to a right of "approval" does not appear anywhere in the historical record.[3] Although Kansas claims that

[3] It is interesting that the affidavit of Douglas R. Littlefield, Ph.D., the historian retained by Kansas, speaks only of the right to "review and comment" on plans for the reregulation of native waters of the Arkansas River, and not the right of approval which Kansas claims was intended by the Compact negotiators. Kansas' Response at 2.

such authority may be "implied" (*id.* at 30), nothing in the record supports a conclusion that the Compact Administration was intended to have greater authority than is evident from the Compact itself. The powers of the Compact Administration were carefully circumscribed.

Kansas argues that the Colorado motion puts the "intent of the parties" at issue. Perhaps, therefore, the most expeditious way to address the issue is first to review the documentary evidence on which Kansas relies.

Kansas claims that the original version of the present Article IV-D was intended ". . . to provide the Compact Administration with the express authority to review future proposals and plans under the terms of the Flood Control Act of 1944," and this was the means ". . . to ensure that future developments would have to be approved by the Compact Administration." *Id.* at 36-37. General Kramer did, in fact, draft a provision that would have incorporated the policy and procedure set forth in Section 1 of the Flood Control Act of 1944 into the Compact. Flood Control Act of 1944, Ch. 665, 58 Stat. 887. He sent the draft to Colorado Commissioner Henry C. Vidal, Chairman of the Commission's Legal Affairs Committee, under a covering letter dated September 30, 1946, which stated in part:

> "As you know, we have had some discussions in previous meetings of the Colorado-Kansas Arkansas River Compact Commission regarding compact provisions with respect to future plans and projects affecting the waters of the Arkansas River which may be developed by the War Department or by the Department of the Interior. I advanced the thought at one of

> our meetings that the compact might meet this situation by including a clause whereby the coordinating procedure between Federal Departments and affected States established in the Flood Control Act of December 22, 1944, would be extended in application to the body to be established for administering the Arkansas River Compact." Kansas' Response to Colorado's Motion to Stay and Motion for Partial Summary Judgment, Exhibit 110.

The actual draft language prepared by General Kramer notes that under the Flood Control Act of 1944 the Federal agencies were required ". . . to submit plans, proposals or reports to the affected State or States." *Id.* The reference to that Act was intended to have ". . . the effect of requiring such submittal also to the Arkansas River Compact Administration in the case of any investigation, plan, proposal or report which may affect the waters of the Arkansas River or any provision of this Compact." *Id.* Significantly, General Kramer did not propose that Federal plans could not proceed unless *approved* by the Compact Administration. The statement in the Kansas brief that the Kramer draft required all future Federal plans to be submitted "for approval" overstates the plain provisions of the Kramer document. Kansas' Response at 13.

General Kramer's draft provision was not incorporated into the Compact. However, at least one later proposed Compact Article, numbered XI, also made express reference to the Flood Control Act of 1944. Kansas' Response, Exhibit 112 at 4-6. The reference in the draft Article, however, appears to be more concerned with the so-called "paramountcy" issue than with any requirement

of submitting Federal plans to the Compact Administration. The paramountcy clause in the Flood Control Act of 1944, as applied to the Arkansas River, would have made navigation and power subservient to irrigation use. The proposed Article XI draft brought opposition from the Federal Power Commission. As Kansas acknowledges, a "watered-down version" of Article XI was then proposed which stripped the Article of any reference to specific Federal statutes, Kansas' Response at 14. But even the revised Article XI was objected to by both the War Department and the Department of Interior. Kansas acknowledges that this opposition forced the deletion of both the proposed Articles X and XI from the Compact draft. *Id.* at 16, 38-39.

Thus, none of the draft provisions on which Kansas relies were finally included in the Compact. Kansas says the Compact negotiators finally "agreed to rely on the provisions of existing federal law" in relation to future developments on the river. But even if this argument is accepted, the law did not provide that the affected States, or the Compact Administration, would have the power of approval over the construction or operation of Federal projects. The Flood Control Act of 1944 provides only that Federal plans and proposals will be submitted to "affected states" for their "views and recommendations," and that such "views and recommendations" will be included among the documents submitted to Congress. Flood Control Act of 1944, Ch. 665, § 1(a) and (c), 58 Stat. 887. It does not give any State the power to approve or disapprove Federal projects.

In its brief, Kansas slips back and forth between two differing statements of its position. At times, Kansas states that the Compact Administration was intended to have the authority to require the "submission" of plans for Federal projects; that the Administration wanted "an official say" concerning future plans for the reregulation of native waters, "even if that say was channeled through the governors of Kansas and Colorado." Kansas' Response at 9, 16, 30, 33. In other places, Kansas states that a right of "approval" was intended. Kansas' Response at 12-13, 34-35, 37, 41. When using "approval," the Special Master understands Kansas' position to be that any project involving the reregulation of the waters of the Arkansas River cannot proceed without the approval of the Compact Administration. The 1951 Resolution says there shall be no reregulation of native waters "until" a plan of operation has been "submitted to, and approved by," the Compact Administration. In 1985 the Kansas Attorney General confirmed Kansas' position that the 1951 Resolution was a bilateral decision precluding reregulation of the native waters of the Arkansas River "until a plan of operation had been approved by the Administration." Colorado's Motion for Partial Summary Judgment on the 1951 Resolution, Exhibit 27 at 5-6.

Clearly there is a difference between merely requiring Federal plans to be submitted to the Administration, and giving that Administration a veto power over the construction or operation of such projects. At best, the historical record suggests that some Compact negotiators wanted, and perhaps expected, that plans for future Federal development would be submitted not only to the affected States, but also to the Compact Administration.

However, the historical record does not support Kansas' claim that the Compact negotiators intended to give the Compact Administration power to control future Federal operations on the Arkansas River.[4]

The 1951 Resolution, adopted two years after the approval of the Arkansas River Compact, did not assert that the Compact Administration already possessed independent authority over the Fryingpan-Arkansas Project. Rather, that Resolution was framed merely in the form of a recommendation to the Governors of Kansas and Colorado. The 1951 Resolution came about in response to the Feasibility Report on the Fryingpan-Arkansas project issued by the Bureau of Reclamation. In 1951, that report was transmitted by the Secretary of the Interior to Kansas and Colorado for their written views and recommendations as required by Section 1(c) of the Flood Control Act of 1944. *Id.*, Exhibit 62. At the request of its Chairman, the Compact Administration was also furnished a copy. *Id.*, Exhibit 69 at 3. The Compact Administration composed its comments in the form of the 1951 Resolution, and asked the Governors of Colorado and Kansas to transmit

---

[4] In his report to Congress on the proposed Compact, General Kramer made only the following modest statement with respect to future Federal plans: "It is to be presumed that the Federal agencies will respect the above provisions as a matter of course in their development plans for the Arkansas River basin. It is also presumed by the compact negotiators that when such plans are submitted to the Governors of the affected States, pursuant to the provisions of the Flood Control Act of December 22, 1944, the Governors of Colorado and Kansas will be especially mindful of the protective provisions of Article IV-D in formulating their official views and recommendations." Colorado's Motion, Exhibit 59 at 41; *id.*, Exhibit 60 at 36.

it to the Secretary of Interior, along with their respective State's comments and recommendations. This was done. The Secretary of Interior then transmitted the Feasibility Report, and all comments thereon, to Congress to secure authorization and funding for the project. The Secretary did not, however, recommend adoption of the policy included in the 1951 Resolution. H.R. Doc. No. 187, 83rd Cong., 1st Sess. 9-13 (1953).

The submittal made by the Governor of Kansas on the Fryingpan-Arkansas Project expressed his State's concern that reregulation of native waters not be "detrimental" to Kansas, but the Governor made no reference to approval by the Compact Administration for such protection. Instead, he stated only that:

> "We assume, of course, that no such attempt at re-regulation would be made or desired without a meeting of the two states and the United States after completion of the project." Colorado's Motion, Exhibit 62.

The Fryingpan-Arkansas project was not actually authorized by Congress until 1962. The authorizing legislation does not include any provision that the reregulation of the native waters of the Arkansas River be subject to the approval of the Compact Administration. The legislation simply directed the Secretary of the Interior "to construct, operate, and maintain the Fryingpan-Arkansas project Colorado, in substantial accordance with the engineering plans therefor set forth in House Document No. 187, Eighty-Third Congress . . ." 42 U.S.C. §§ 616-616f. The water supply plans and estimated project revenues were based on storage of winter flows in Pueblo Reservoir. H.R. Doc. No. 187 at 32, ¶65; *id.* at 35, ¶70.

Kansas argues, nonetheless, that congressional approval of the project followed "Colorado's assurances" that any reregulation of native waters would be subject to approval of the Compact Administration "as demanded by Kansas." Kansas' Response at 48. The record shows that Representative Avery of Kansas read a letter from the Kansas Water Resources Board referring to the substance of the 1951 Resolution, and concluding that Kansas therefore ". . . assumes that any reregulation of the native waters will be subject to the approval of the compact administration." 108 CONG. REC. 8, 10144 (1962). On the floor of the House, the following exchange then occurred between Representative Avery and Representative Aspinall of Colorado:

> "MR. AVERY. I would like to have the assurance of the chairman of the committee that if this bill is to pass and the project is to be authorized that all management of what is described as 'native water in the Arkansas River' will be submitted for approval by the Kansas-Colorado-Arkansas River Compact Administration.
>
> "MR. ASPINALL. I would answer the gentleman this way: The Fryingpan-Arkansas project has the unanimous consent of the Arkansas River Compact Administration, and the Arkansas River Compact Administration has a representative from Kansas. So the answer is 'Yes,' native waters will be treated as they are supposed to be treated in compliance with the Arkansas River compact." *Id.*

The Aspinall response, however, is hardly as direct or unambiguous as Kansas claims. Certainly it is less than a

clear affirmation that native waters would not be reregulated in the Fryingpan-Arkansas project without the prior approval of the Compact Administration. Colorado also points out that Representative Aspinall was not an officer or agent of the State of Colorado, and in the Committee hearings, the official State position was presented by the Director of the Colorado Water Conservation Board. Colorado's Reply at 49; *Hearings on H.R. 2206, 2207, 2208 and 2209 Before the Subcomm. on Irrigation and Reclamation of House Comm. on Interior and Insular Affairs*, 87th Cong., 1st Sess. 148 (1961).

Moreover, Kansas does not include the response of Representative Rogers of Colorado which was even more equivocal:

> "Further answering the gentleman's question, and emphasizing what the gentleman from Colorado [Aspinall] has said, the gentleman from Kansas [Avery] recognized that there is a compact between the State of Colorado and the State of Kansas which everybody has agreed works perfectly. The enactment of this legislation will not change that situation in any manner whatsoever." 108 CONG. REC. 8, 10145 (1962).

More important, however, such a brief exchange, without consideration of the views of the committee or the affected Federal agencies, hardly seems adequate to establish the intent of Congress on an important Federal issue.[5] Kansas cites *West Virginia ex rel. Dyer v. Sims*, 341

[5] For example, Kansas does not consider H.R. Doc. No. 694. In describing the project, the Document refers specifically to ". . . the regulation of winter flows amounting to 88,000 acre

U.S. 22 (1951), for the proposition that Colorado should be estopped by the Aspinall statement. But that case was based on a covenant made by the state legislature, not on a response by an individual congressman. Remarks of a single legislator, even the sponsor, are not controlling in analyzing legislative history. *Chrysler v. Brown*, 441 U.S. 281, 312 (1979); *Sierra Club v. Costle*, 657 F.2d 298 (D.C. Cir. 1981). Statements by individual legislators should generally be given little weight when searching for the intent of the entire legislative body. *National Welfare Rights Organization v. Mathews*, 533 F.2d 637, 642-43 (D.C. Cir. 1976); *Castaneda-Gonzalez v. Immigration & Nat. Service*, 564 F.2d 417, 424 (D.C. Cir. 1977). Moreover, had the issue been fully aired, it seems unlikely that Congress would have placed part of the operation of a Federal project in the hands of an administrative body that might be incapable of taking action because of the unanimous consent requirement in the Compact.

The later conduct of the Compact Administration confirms the view that it did not have the power to require prior approval of the winter storage program. Construction of Pueblo Reservoir was completed in 1975 and the first winter storage program was begun that year. Colorado's Motion, Exhibit 55 at ¶5. A winter storage program has been operated in Pueblo Reservoir every

feet. . . ." H.R. Doc. No. 694 at 4. It states further that the project will be operated ". . . in accordance with the 'operating principles' set out in H.R. Document 130 of the 87th Congress." *Id.* at 12. In turn, House Document 130 sets forth the operating principles adopted by the State of Colorado on April 30, 1959. These operating principles do not include Compact Administration approval of a winter storage program.

winter since that time, with the exception of the winter of 1977-78. *Id.* at ¶12. Kansas admits that it did not raise the 1951 Resolution until 1982. Kansas' Response at 23.

Kansas tries to explain its delay, and the inaction of the Compact Administration, by stating that the winter storage program was referred to in minutes, and by speakers at various meetings, as "experimental," "provisional," and "temporary." Kansas' Response at 23-25. But it might have been expected that the Compact Administration, if it truly had the power, would have wanted to approve the program at its outset. Indeed, its interest might even have been heightened if the program were experimental and its impacts uncertain. Furthermore, the 1951 Resolution does not make any exceptions for experimental programs. It refers to *any* reregulation of the native waters of the Arkansas River.

The initial operating plan for the winter storage program was developed by the Southeastern Colorado Water Conservancy District ("Southeastern District") and the participating water users with the assistance of the Bureau of Reclamation, the U.S. Geological Survey, and Colorado water officials. Colorado's Motion, Exhibit 55 at ¶¶9, 10. A repayment contract between the Southeastern District and the United States for winter storage in Pueblo Reservoir was signed in 1965. *Id.*, Exhibit 67; *id.*, Exhibit 55 at ¶¶5, 45. Meetings to develop the winter storage program began in 1969 between representatives of the Southeastern District and Colorado water users in the Arkansas Valley. *Id.*, Exhibit 55 at ¶¶9, 11. The program, with the assistance of the Bureau of Reclamation, the U.S. Geological Survey, and the Colorado Division Engineer, was finalized in 1975. *Id.*, Exhibit 55 at ¶¶11

and 14. Following agreement on an operating plan, the negotiating committee was reformulated as the Board of Trustees of the Winter Storage Program. *Id.*, Exhibit 55 at ¶14.

The Chairman of the Winter Storage Committee of the Southeastern District, and later the Chairman of the Board of Trustees of the program, was Charles L. ("Tommy") Thomson, General Manager of the Southeastern District. He appeared at several meetings of the Compact Administration from 1970 to 1975, at which he discussed the planning for the winter storage program. *Id.*, Exhibit 55 at ¶10. He then appeared at the December, 1975, annual meeting of the Compact Administration, and advised the Administration of the start of the winter storage program. *Id.*, Exhibit 55 at ¶¶16, 17; *Id.*, Exhibit 71 at 7. No objection to the commencement of the program was raised either by the Compact Administration or Kansas. *Id.*, Exhibit 55 at ¶17. Nor was there any mention of the 1951 Resolution, or the right of the Compact Administration to approve the program before it was implemented.

Instead, the Compact Administration merely adopted a Resolution directing its Special Engineering Committee to review the operations of the Fryingpan-Arkansas Project, and to report to the Compact Administration at each annual meeting on the relationship between the project and the Arkansas River Compact. *Id.*, Exhibit 55 at ¶19; *id.*, Exhibit 71 at 8. Mr. Thomson was also requested to appear at the next meeting of the Compact Administration to report on the results of the program, and he did this in May, 1976. *Id.*, Exhibit 55 at ¶21; *id.*, Exhibit 72 at 5-9. Beginning in 1975, the Secretary of the Compact

Administration began attending the meetings of the Board of Trustees of the Winter Storage Program, and in 1977, Mr. Carl Bentrup, one of Kansas' Representatives, was appointed to represent the Compact Administration at these meetings. *Id.*, Exhibit 55 at ¶20; *id.*, Exhibit 77 at 54-55.

The actions of the Compact Administration over many years are hardly consistent with a view that the Administration's approval was required before the winter storage program could be implemented. On the contrary, the Administration's conduct supports Colorado's and the United States' views, namely, that the Administration's authority was limited to monitoring and investigating any impact that the winter storage program might have on Kansas' entitlement under the Compact. Any violations of the Compact would be subject to Article VIII.

Given the Special Master's conclusions on the authority of the Compact Administration, it is not necessary to rule on Colorado's additional grounds for its motion; namely, that the 1951 Resolution was modified and superseded, and that Kansas should be precluded from attempting to enforce the policy expressed in the 1951 Resolution on the grounds of laches, estoppel and equitable principles of fair dealing. Colorado maintains that Kansas has accepted the benefits of the winter storage program. Kansas denies these allegations.

Apart from the substantive issues, Kansas also argues that summary judgment on this motion is inappropriate for three reasons: (1) that genuine issues of material fact exist; (2) that summary judgment is strongly disfavored

for resolving questions of intent, such as exist with respect to the 1951 Resolution; and (3) that summary judgment is disfavored for deciding questions in complex litigation.

The fundamental question here involves the powers of the Compact Administration. That is a question of the statutory interpretation of the Arkansas River Compact and the Federal legislation authorizing the Fryingpan-Arkansas Project. Volumes of documentary history have been submitted to aid in such interpretation. While the conclusions to be drawn from this record are certainly at issue, there do not appear to be material issues of fact. Matters of statutory interpretation and application present issues of law, not fact, and in the final analysis, it is ". . . the province and duty of the judicial department to say what the law is." *Diamond v. Chakrabarty*, 447 U.S. 303, 315 (1980) (quoting *Marbury v. Madison*, 5 U.S. 137 (1 Cranch) (1801)); *see also Fed. Election Comm'n. v. Democratic Senatorial Campaign Comm.*, 454 U.S. 27, 31 (1981); *State of Cal. ex rel. State Water Resources Control Bd. v. Federal Energy Regulatory Comm.*, 877 F.2d 743, 745-46 (9th Cir. 1989). Particularly is this true with respect to interstate compacts. In *Texas v. New Mexico*, 462 U.S. 554 (1983), for example, the Supreme Court recognized that:

> "If there is a compact, it is a law of the United States . . . and our first and last order of business is interpreting the compact." 462 U.S. at 567-568.

There is no indication that documentary evidence not already presented with this motion, or other admissible non-documentary evidence on the issue, would be offered at trial. Kansas has presented two affidavits in

support of its argument that material issues of fact are in dispute. Colorado has moved to strike the crucial portions of these affidavits, but apart from the Special Master's ruling on that motion, these affidavits do not demonstrate material factual issues concerning the matters decided in this Report.

It is evident from the affidavit of the historian, Dr. Littlefield, that he has undertaken the same kind of examination of source documents that would ordinarily be made by a court for purposes of determining legislative or administrative intent. The events recited in Dr. Littlefield's affidavit are simply part of the historical record available to the Court for its review. The interpretation given by Dr. Littlefield to those actions are his own conclusions, not facts, drawn from the historical record, and cannot supplant the interpretation which ultimately is within the power of the Court to make. The conclusions in the Littlefield affidavit are actually more guarded than Kansas sometimes claims. Nonetheless, and even if the affidavit were to be considered, the Special Master reaches different conclusions based on his review of the historical record.

The affidavit of Carl E. Bentrup indicates that he has been a Kansas Commissioner on the Arkansas River Compact Administration since June 7, 1957. He testifies about what the "parties intended" in the 1951 Resolution, and what was "understood by all concerned." However, from the affidavit itself, it appears that his conclusions came from conversations with two of the first Commissioners. Other portions of his affidavit are factual and based on personal knowledge, but appear to relate to Colorado's allegations of laches and estoppel. Those

issues are not necessary to a resolution of Colorado's motion.

Citing Professor Moore, Kansas also asserts that summary judgment is disfavored for resolving questions of intent. Kansas' Response at 28. However, Moore clearly states that summary judgment is proper when there are no triable issues of fact and the moving party is entitled to summary judgment as a matter of law. 6 J. Moore & J. Wicker, *Moore's Federal Practice*, ¶56.17 (2d. ed. 1981). Summary judgment provides an appropriate mechanism for resolving legal questions of statutory and regulatory construction. *Standard Oil Co. v. Department of Energy*, 596 F.2d 1029, 1066 (Temp. Emer. Ct. App. 1978); *Mobil Oil Corp. v. Federal Energy Administration*, 566 F.2d 87 (Temp. Emer. Ct. App. 1977).

Finally, Kansas contends that partial summary judgment should be denied because the present case constitutes "complex litigation." Kansas' Response at 29. Kansas relies on Justice Jackson's opinion for the Court in *Kennedy v. Silas Mason Co.*, 334 U.S. 249 (1948). That decision was based, in part, on the need for "a more solid basis of findings based on litigation." 334 U.S. at 257. However, there is no indication here that the evidence at trial on the issue now decided would be different than the record now before the Special Master. Most courts have recognized that if the decision rests upon an issue of law, the fact that it is complex or poses difficult problems of interpretation or application should not stand in the way of a summary judgment motion, if there is no triable issue of fact. C. Wright, A. Miller & M. Kane, *Federal Practice and Procedure*, § 2732, at 304-307, citations omitted. Only a narrow legal issue, albeit important, has been

decided in this motion. The factual issues concerning any impact of the winter storage program on Kansas' entitlement under the Compact are reserved for trial.

Accordingly, the Special Master recommends that the Colorado Motion for Partial Summary Judgment on the 1951 Resolution be granted.

Colorado's Motion to Strike Affidavit Testimony of Douglas R. Littlefield and Carl E. Bentrup

Colorado has moved, pursuant to Rule 56, to strike Paragraphs 5-11 of the Affidavit of Douglas R. Littlefield, Ph.D., and Paragraphs 4-6 and 10 (last sentence) of the Affidavit of Carl E. Bentrup. The Special Master grants this motion.

Mr. Bentrup testifies in his affidavit as to the intent of the Compact Administration in 1951 when it adopted the 1951 Resolution. This was six years before Mr. Bentrup became a Commissioner on the Arkansas River Compact Administration. The affidavit indicates on its face that his knowledge came from conversations with two of the first Commissioners. Apart from the basic difficulty of determining the intent of a legislative or administrative body in this fashion, Mr. Bentrup's testimony is clearly based on hearsay. It is not admissible under Rule 56(e). *Friedel v. City of Madison*, 832 F.2d 965, 970 (7th Cir. 1987); *Pan-Islamic Trade Corp. v. Exxon Corp.*, 632 F.2d 539, 556 (5th Cir. 1980), *cert. denied*, 454 U.S. 927 (1981); *Maiorana v. MacDonald*, 596 F.2d 1072, 1080 (1st Cir. 1979). Even the post-enactment statements of those legislators actually involved in the enactment process have no probative weight. *Bread Political Action Committee v. Federal Election*

Commission, 455 U.S. 577, 581-84 (1982); *Petry v. Block*, 697 F.2d 1169, 1171 (D.C. Cir. 1983).

Both Dr. Littlefield and Mr. Bentrup testify as to issues of intent – of the Arkansas River Compact negotiators, of various Federal agencies, of Congress, and of the States of Kansas and Colorado. Such intent, to the extent relevant, involves interpretation of the Arkansas River Compact, the Fryingpan-Arkansas legislation, and the 1951 Resolution. The interpretation of such statutory and administrative action presents questions of law, to be decided by the Court. *Diamond v. Chakrabarty*, 447 U.S. 303, 315 (1980); *United States v. Montoya*, 827 F.2d 143, 146 (7th Cir. 1987); *Union Pacific Land Resources Corp. v. Moench Inv. Co., Ltd.*, 696 F.2d 88, 93 n. 5 (10th Cir. 1982), *cert. denied*, 460 U.S. 1085 (1983); *Texas v. New Mexico*, 462 U.S. 554, 567-68 (1983); *Petty v. Tennessee-Missouri Bridge Comm.*, 359 U.S. 275, 279 (1959).

Dr. Littlefield's testimony is based upon his review of primary historical documents, and represents his conclusions rather than factual evidence not otherwise available to the Court. Opinion testimony providing legal conclusions is not admissible. *Van Winkle & Co. v. Crowell*, 146 U.S. 42, 49 (1892); *United States v. Scop*, 846 F.2d 135, 139-42 (2d Cir. 1988); *United States v. Curtis*, 782 F.2d 583, 599 (6th Cir. 1986); *United States v. Zipkin*, 729 F.2d 384, 386-87 (6th Cir. 1984); *Owen v. Kerr-McGee Corp.*, 698 F.2d 236, 239-40 (5th Cir. 1983); *Marx & Co., Inc. v. The Diners' Club, Inc.*, 550 F.2d 505, 509-10 (2d Cir. 1977), *cert. denied*, 434 U.S. 861 (1977). In a supplemental brief, Kansas has made available the decision of the Special Master in *Nebraska v. Wyoming*, 325 U.S. 589 (1945). Tenth Memorandum of Special Master. From the material presented,

however, it appears that the affidavits involved in that decision are distinguishable from those here.

Kansas argues that the 1951 Resolution was not a legislative enactment, but rather a "bilateral agreement between two parties" that should be analyzed under contract law. Kansas' Response at 3. It is not clear that applying contract law would save either of these affidavits, but the Special Master does not agree that the 1951 Resolution represents such an agreement. It was simply a resolution adopted by the Arkansas River Compact Administration, an interstate agency, which set forth its findings of fact, comments, and recommendations to the Governors of Kansas and Colorado on the Feasibility Report for the Fryingpan-Arkansas Project. It was a policy statement by an administrative agency, not an agreement between the States of Kansas and Colorado. The Compact Administration is "a body outside the State" which has been granted, by the Compact, a "reasonable and carefully limited delegation of power." *West Virginia ex rel. Dyer v. Sims*, 341 U.S. 22, 30-31 (1951). There is no question about what the 1951 Resolution states. However, the legal right of approval over the reregulation of native waters of the Arkansas River cannot come from the Resolution. Any such authority must derive from the Compact or the authorizing legislation for the Fryingpan-Arkansas Project. The Special Master concludes that the Compact Administration was not vested with such authority.

Colorado's Motion to Stay Review of Kansas' Claim of Injury from the Winter Storage Program

Colorado's earlier motions dealt with a discrete legal issue, i.e., the authority of the Compact Administration to approve the winter storage program. Now Colorado turns to the actual impact, if any, of the winter storage program on Kansas' entitlement. Colorado moves that the Special Master not review at this time any complaint by Kansas that the operation of the winter storage program has materially depleted the waters of the Arkansas River in violation of the Compact. The ground for the motion is that Kansas has failed to make a reasonable effort to exhaust its administrative remedies with regard to any claim of injury from the operation of the winter storage program. Colorado maintains that Kansas should be required first to pursue any factual claim of injury through the Compact Administration.

It is evident that any earlier action by the Compact Administration concerning the winter storage program was at least impeded, and perhaps blocked, by the legal disagreement between the States over the 1951 Resolution. However, that legal issue having now been decided, it does not necessarily follow that the question of injury from the program should be returned to the Compact Administration for its investigation.

Colorado supports its motion with a lengthy statement of facts which it claims are not in dispute. Colorado's Motion at 3-28. According to Colorado, these "facts" show that Colorado has always supported a review of the winter storage program by the Compact Administration (*id.* at 31-32); that although Kansas

alleged injury from the winter storage program in February, 1985, its "real interest" was enforcing adherence to its interpretation of the 1951 Resolution (*id.* at 34); that by withholding the Spronk report, Kansas did not "fairly" pursue the 1985 investigation authorized by the Compact Administration (*id.* at 32-33); that on more than one occasion Kansas vetoed Administration action because Colorado would not agree on the 1951 Resolution (*id.* at 33); that various studies from 1975 to 1981 showed no reduction in inflows to the downstream John Martin Reservoir resulting from the winter storage program (*id.* at 34); and that Kansas has actually benefited, and has continued to accept those benefits, from the winter storage program. *Id.* at 34. It is sufficient to note here that these conclusions, and many of the facts stated by Colorado, are vigorously disputed by Kansas. However, a resolution of these factual issues is not required to decide this motion, and if such issues prove to be relevant, they are better decided at trial.

The parties do agree, nonetheless, that the Compact Administration decided in March, 1985, to investigate the operation of Pueblo Reservoir and the winter storage program. Colorado's Motion, Exhibit 28 at 3. Further, the record shows that both States submitted reports as part of that investigation, and that the reports reached conflicting conclusions about the effect of a winter storage program. *Id.*, Exhibit 47 at 22; *id.*, Exhibit 36 at 21. The Compact Administration, accordingly, was authorized to proceed only in other areas upon which there was mutual agreement. *Id.*, Exhibit 37 at 34-38. Under these circumstances, it appears that reasonable efforts were made

before the Compact Administration. It is also worth noting that some of the matters complained of by Colorado occurred after the Kansas complaint was filed.

Finally, the Special Master believes that a practical approach must be taken toward this motion. The Compact Administration can act only by unanimous vote of the representatives of the two States. Arkansas River Compact at Article VIII-D. It is not realistic, while this lawsuit is pending, to expect that these representatives will agree on the question of whether the winter storage program injures or benefits Kansas, or whether a Compact violation has occurred.

Colorado properly points out that the Kansas complaint does not specifically allege injury from the winter storage program. Rather, the express reference in the complaint is to Colorado's alleged unilateral rejection of the 1951 Resolution. However, the complaint does allege generally that the State of Colorado and its water users have materially depleted the usable and available stateline flows of the Arkansas River since the adoption of the Compact. Colorado acknowledges that it has been on notice since at least March, 1986, that Kansas intended to assert injury from the winter storage program. Colorado's motion at 24. The Special Master believes that the pleadings are broad enough to embrace this issue. Indeed, if the Special Master is to try the issue of whether stateline flows have been materially depleted in violation of the Compact, all possible causes should be considered. One possible cause should not be reserved to investigation by the Compact Administration, while the Special Master tries the basic issue and considers all other possible causes.

Accordingly, the Special Master denies Colorado's Motion to Stay.

DATE: September 15, 1989

/s/ Arthur L. Littleworth
Arthur L. Littleworth
Special Master

1951 Compact Administration Resolution

WHEREAS the Arkansas River Compact Administration, an official interstate body created by the Arkansas River Compact and charged with the administration of such compact, is interested in the proposed development to the extent that its construction and operation shall not interfere with the rights, interests and obligations of Colorado and Kansas under the Compact;

NOW BE IT RESOLVED by the Arkansas River Compact Administration that the following comments and recommendations relating to said report of the Secretary of Interior, to wit:

> The Arkansas River Compact Administration submits these comments and recommendations to the Governors of Colorado and Kansas respecting the proposed Initial Development, Gunnison-Arkansas Project, Roaring Fork Diversion, Colorado, namely:

1. The Administration understands that the project plan proposes:

   (a) The importation by appropriate project works of approximately 70,000 acre-feet of water a year from the Colorado River Basin to the Arkansas River Basin for supplemental irrigation and domestic water supplies in Colorado and for the production of hydroelectric energy.

   (b) In connection with such importation of water and its regulation in the Arkansas River Valley by project works, the re-regulation of native waters of the Arkansas River (the term 'native waters', as herein used, being those waters covered and defined by

those waters covered and defined by Art. III-B of the Arkansas River Compact).

2. The interstate water relations of Colorado and Kansas with respect to the Arkansas River do not justify any objection to the proposed project development for the importation of Colorado River water (described in sub-paragraph (a) above).

3. The re-regulation of native waters of the Arkansas River (native waters being as above mentioned) concerns the Arkansas River Compact Administration and both Colorado and Kansas in complying with the provisions of the Arkansas River Compact and maintaining the benefits and obligations of the two states under that Compact. To that end, it is recommended to the Governors of Colorado and Kansas, and expressed as a policy of the Arkansas River Compact Administration, that the Initial Development, Gunnison-Arkansas Project, Roaring Fork Diversion, Colorado, as set forth in Project Planning Report No. 7-8a. 49-1 of the Bureau of Reclamation, be approved; provided, however, that there shall be no re-regulation of native waters of the Arkansas River as proposed in such report until a plan of operation, rules, regulations, procedures and agreements in furtherance thereof, including any pertinent agreements between the Corps of Engineers and the Bureau of Reclamation, shall have been submitted to, and approved by, the Arkansas River Compact Administration and the affected water users.

4. It is the purpose and intent of these recommendations that the proposed project development shall not interfere with or defeat the rights, interests and obligations of Colorado and Kansas under the Arkansas River Compact.

be transmitted to the Governors of the States of Colorado and Kansas and such Governors be and are hereby requested to submit the same to the Secretary of Interior with their official State comments and recommendations upon said proposed project and development.

On vote being taken, the motion carried and was declared adopted.

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business address is Best, Best & Krieger, 400 Mission Square, 3750 University Avenue, Riverside, California 92502.

I am readily familiar with Best, Best & Krieger's practice for collecting and processing correspondence for mailing with the United States Postal Service. Under that practice, all correspondence is deposited with the United States Postal Service the same day it is collected and processed in the ordinary course of business.

On September 15, 1989, I served the within REPORT OF SPECIAL MASTER RE WINTER STORAGE PROGRAM by placing copies of the document in separate envelopes for each addressee named below and addressed to each such addressee as follows:

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On September 15, 1989, at the office of Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502, I sealed and placed each envelope for collection and deposit by Best, Best & Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on September 15, 1989, at Riverside. California.

/s/ Sandra L. Simmons
Sandra L. Simmons

No. 105, ORIGINAL

In The

Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

and

UNITED STATES OF AMERICA,

Defendant-Intervenor.

ARTHUR L. LITTLEWORTH, Special Master

REPORT – PART III

DECISION OF SPECIAL MASTER ON COLORADO'S MOTION TO DISMISS KANSAS' TRINIDAD RESERVOIR CLAIM

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant, UNITED STATES OF AMERICA, Defendant-Intervenor.	)	No. 105 Original October Term, 1985

ARTHUR L. LITTLEWORTH, SPECIAL MASTER

DECISION OF SPECIAL MASTER ON COLORADO'S MOTION TO DISMISS KANSAS' TRINIDAD RESERVOIR CLAIM

(Filed June 9, 1992)

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IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant, UNITED STATES OF AMERICA, Defendant-Intervenor.	)	No. 105 Original October Term, 1985

DECISION OF SPECIAL MASTER ON COLORADO'S MOTION TO DISMISS KANSAS' TRINIDAD RESERVOIR CLAIM

I.

INTRODUCTION

At the conclusion of Kansas' presentation of evidence on the operation of Trinidad Reservoir, counsel for Colorado announced that it would file a motion to dismiss that portion of the Kansas claim.[1] By stipulation, the motion was filed and briefed during the recess occasioned by the illness and ultimate withdrawal of Kansas' chief technical expert.

The Colorado motion rests upon the ground that Kansas failed to demonstrate upon the facts and the law that the operation of the Trinidad Project resulted in a

[1] Although Kansas had not rested its entire case, counsel indicated that Kansas had completed its evidence on the Trinidad Project. RT Vol. 78 at 138, 144-45 (May 16, 1991); RT Vol. 81 at 28-29 (May 21, 1991).

violation of the Arkansas River Compact. Colorado argues that Article IV-D of the Arkansas River Compact specifically allows future development in Colorado, by Federal or State agencies, including dams and reservoirs, provided that such development does not cause a material depletion in the usable flows of the Arkansas River to users in Kansas, and that Kansas failed to establish the required depletion.

The Kansas legal theory is based upon an alleged violation of Operating Principles that were approved by the Arkansas River Compact Administration for the operation of the Trinidad Project. Although Colorado does not concede that such a violation occurred, Kansas produced substantial evidence to that effect, and a violation of the Operating Principles has been assumed for purposes of this decision. It is the Kansas position that any failure to abide by the Operating Principles constitutes a Compact violation; that during the initial period of operation of Trinidad Reservoir (from 1979 to 1984) the tributary inflows from the Purgatoire River into John Martin Reservoir on the Arkansas River were substantially less in certain months than they would have been if the Operating Principles had been strictly observed; and that Kansas was entitled to 40 percent of the water thus lost to the Arkansas River.

Kansas Attorney General Robert T. Stephan, who personally made the opening statement for Kansas, said that these depletions totaled at least 20,000 acre-feet ("AF") over the 1979-84 period. RT Vol. 1 at 96 (September 17, 1990). Expert testimony for Kansas put the amount between 24,500 and 27,500 AF. RT Vol. 18 at 57 (Oct. 23, 1990); Kan. Exh. 580.

Although Trinidad Reservoir is a Federal project, the United States filed a statement that it did not intend to provide testimony or analysis during the trial on whether departure from the Operating Principles resulted in "injury" to Kansas, and accordingly, it would be "inappropriate" for the United States to take a position on whether Kansas had presented sufficient evidence to prove a Compact violation.

At the resumption of the trial on February 24, 1992, I presented my preliminary analysis and view of the motion, and requested later oral argument focusing on that analysis. Much of the day on March 10, 1992 was devoted to this argument. The parties at that time also requested an opportunity to file additional written argument and authorities. The last of these documents was filed on April 2, 1992.

The fundamental issue on which the Colorado motion turns is whether Kansas is required to show a material depletion in stateline flows caused by the operation of Trinidad Reservoir, or is required to prove only that the Operating Principles for the Project were violated, and that such violation caused less water to flow into John Martin Reservoir than would have occurred under strict compliance with the Operating Principles. Kansas did not attempt to establish that the flows of the Arkansas River at the state line were less than they would have been if the Trinidad Project had not been constructed or operated at all.

In the supplemental statements filed after oral argument, the United States raised new questions. The United States acknowledges that if a violation of the Operating

Principles is not enough to prove a Compact violation, then the Kansas claim is ripe for dismissal based upon its trial decision not to ". . . present evidence on the stateline impacts caused by the improper operations." U.S. Post-Argument Remarks at 2. But the United States goes on to ask whether a separate cause of action is available under the Compact to enforce compliance with its investigatory and administrative provisions in regard to the Trinidad Project, and if so, what allegations and proof are required. Those issues are also addressed in this decision.

II.

BACKGROUND INFORMATION

A. The Purgatoire River.

The Purgatoire River is a major tributary of the Arkansas. It flows in a northeasterly direction joining the main stem of the Arkansas at Las Animas just upstream of John Martin Reservoir. The Purgatoire originates on the eastern slopes of the Sangre de Cristo Mountains, which rise to elevations of 13,000 feet near the river's source. From this mountainous area, the river flows easterly, dropping rapidly for about 40 miles through rough and rocky terrain, and then emerging in the high plains area near the City of Trinidad. Here the elevation is about 6,000 feet. The river then flows through a wide shallow valley for about 35 miles before entering a narrow, rugged canyon for another 100 miles. This canyon gradually widens and merges with the extensive flat lands of the Arkansas Valley surrounding the City of Las Animas. Jt. Exh. 24a at 6.

Precipitation at Trinidad is on the order of 17 inches annually, and higher in the mountainous portion of the drainage basin. About 61 percent of the total precipitation at Trinidad occurs during the spring and summer months of April through August. The Purgatoire River above Trinidad is perennial, with the greatest volume of run-off being produced by melting snow during April, May and June. Thunderstorms produce floods with high peaks and these usually occur after the snow-melt season. Jt. Exh. 34 at 13-14. Flows at the Trinidad gauging station averaged 62,100 AF annually for the period 1925-1957. This study period has been considered indicative of future hydrologic conditions. Annual flows at this station ranged from 16,300 AF in 1951 to 197,300 AF in 1942. Jt. Exh. 24a at 13.

Historically, there were eleven ditch systems supplying irrigation water in the Trinidad area, with water rights priority dates ranging from 1861 to 1920. *Id.* at 11. Diversions averaged 53,200 AF per year. *Id.* at 14. A Bureau of Reclamation study found, however, that only about 37,300 AF of these diversions were actually needed to meet crop requirements. Because supplies in the area were undependable, a large part of the historic diversions were made when the water was available rather than when actually needed to meet crop growth requirements. *Id.* at 16. The Board of Engineers for Rivers and Harbors characterized the streamflow as "erratic and unseasonable for timely irrigation use"; moreover, it found that the existing storage and regulatory facilities were "inadequate for complete regulation of the available water supply for maximum crop utilization." Jt. Exh. 34 at 3.

B. History of the Trinidad Project.

The Bureau of Reclamation initiated preliminary studies to improve irrigation in the Trinidad area as early as 1937. In this same general time-frame, the Corps of Engineers was also considering the "serious and long-standing flood problem" at Trinidad. Jt. Exh. 34 at 42. The Corps at first planned to provide necessary flood protection through the construction of levies and channel improvements without any dam. However, cooperative studies conducted by the Corps and the Bureau during 1952 and 1953 led to recommendations for a reservoir project designed to meet both flood control and irrigation needs. The results of these studies were presented in a Review Report by the Corps of Engineers, June 30, 1953, printed in 1956 in House Document No. 325, 84th Congress, Second Session. Jt. Exh. 34.

House Document No. 325 includes many of the important reports and letters associated with the legislative history of the Trinidad Project. These include not only the basic 1953 Review Report of the District Engineer, but also the report and recommendations of the Chief of Engineers, the Report of the Board of Engineers for Rivers and Harbors, comments of various Federal agencies, correspondence reflecting the views of both Kansas and Colorado, and actions by the Arkansas River Compact Administration with respect to the project. *Id.*

As recommended by the District Engineer, and approved by the Chief of Engineers, the Trinidad Project called for the construction of a dam and reservoir on the Purgatoire River about four miles upstream from the City of Trinidad. *Id.* at 1, 44-46. Capacity of the proposed

reservoir was to be 140,700 AF, allocated as follows: 46,700 AF for flood control, 55,000 AF for irrigation, and 39,000 AF for sediment control. *Id.* at 28.

To obtain "maximum beneficial use of the irrigation storage," the Bureau of Reclamation suggested during this early planning phase that the project be operated according to five basic conditions:

> "(a) Transfer of the storage decree of the Model Land & Irrigation Co., for 20,000 acre-feet annually, from the present site to the proposed Trinidad Reservoir.[2]
>
> "(b) Storage in Trinidad Reservoir of flood flows originating on Purgatoire River above the dam site which would otherwise spill from John Martin Reservoir.
>
> "(c) Storage in Trinidad Reservoir of the winter flows of Purgatoire River historically diverted for winter irrigation of project lands.
>
> "(d) Regulation in Trinidad Reservoir of summer flows historically diverted to project lands provided that future streamflow records disclose such further regulation will not materially decrease depletions or that any material increase in depletions be compensated by suitable replacement to lands served by John Martin Reservoir.

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[2] Historically, the Model Reservoir of the Model Land & Irrigation Co. provided the only significant storage capacity in the area. The storage decree for the Model Reservoir was 20,000 AF, but a survey in 1946 indicated that the usable capacity of the Reservoir had been reduced to 6,200 AF because of sediment deposition and deterioration of the dam. Jt. Exh. 24b, Appendix A at 2.

> "(e) Storage in Trinidad Reservoir of all flood flows originating on Purgatoire River above the reservoir other than those specified in condition (b), provided that suitable replacement is made to John Martin Reservoir to the extent that such storage in Trinidad Reservoir would result in material depletion of the inflow from Purgatoire River into John Martin Reservoir and interfere with its operation as established by the Arkansas River compact." Jt. Exh. 34 at 4.

The District Engineer found that under the Arkansas River Compact the irrigation capacity in the reservoir could be operated in accordance with the first three of these conditions, and that such operation would not "significantly deplete the water supply presently available to water users downstream from the project area." *Id.* However, he stated that the impact of conditions (d) and (e) was "indeterminate," and recommended that the project not be operated pursuant to those conditions until their feasibility "has been demonstrated." *Id.* at 45. Moreover, he noted that operation under conditions (d) and (e) might require suitable arrangements to be made with those served from John Martin Reservoir under the terms of the Arkansas River Compact. *Id.* at 29. The Chief of Engineers and the Board of Engineers for Rivers and Harbors concurred with these recommendations, and I conclude that Congress' authorization embraced only these first three conditions. *Id.* at 1, 4-6; Jt. Exh. 35 at 309.

The District Engineer specifically recognized the Arkansas River Compact in his 1953 report, quoting from appropriate provisions, including Article IV-D, which permits upstream development in Colorado provided

". . . that the waters of the Arkansas River . . . shall not be materially depleted in usable quantity or availability for use. . . ." Jt. Exh. 34 at 21. The District Engineer concluded that operation of the project under these three basic conditions outlined by the Bureau of Reclamation, and accepted by the Corps, ". . . would not result in material depletion of the Purgatoire River inflow to John Martin Reservoir." *Id.* at 30, 43. Reference is made in the Report to specific studies which indicated that the proposed Trinidad Reservoir would deplete the usable inflow to John Martin Reservoir by an average of about 390 AF annually. *Id.* at 41.

In 1954 the Engineering Committee of the Arkansas River Compact Administration reviewed the project and determined that the depletion to John Martin would average 530 AF per year, exclusive of the years in which there would have been spills from the reservoir. Jt. Exh. 19, Oct. 26, 1954 Minutes at 15-16. Hans Kramer, Chairman of the Compact Administration, who had also chaired the Compact negotiations, said the question was whether an average annual depletion of 530 AF constituted a "material" depletion within the meaning of Article IV-D of the Compact. *Id.* at 14. In December, 1954 the Compact Administration voted not to approve the Trinidad Project "at this time." Jt. Exh. 19, Dec. 14, 1954 Minutes at 14. Chairman Kramer notified the Chief of Engineers of this action, stating that the main argument voiced against the project was concern about possible depletion of the supply to John Martin Reservoir. Jt. Exh. 34 at XVII. In General Kramer's own view, as an "engineer," such depletions would be "negligible." Jt. Exh. 19, Oct. 26, 1954 Minutes at 19.

The State of Kansas also initially opposed the project. In a letter to the Chief of Engineers, dated August 5, 1954, Governor Edward F. Arn stated:

> "Even the most conservative estimates indicate an increased depletion of Purgatoire River water. It is our conclusion that the operation of this project would, at times, materially deplete the water supply which would otherwise be available to Kansas water users through the John Martin Reservoir.
>
> "Under these conditions the State of Kansas at this time is opposed to the project as proposed." Jt. Exh. 34 at XV.

The following year, however, the State of Kansas and the Compact Administration both conditionally reversed their positions. Kansas Governor Fred Hall wrote to the Chief of Engineers as follows:

> "This matter subsequently has been given further consideration by both the State of Kansas and the Arkansas River Compact Administration. It is recognized that there is a serious flood-control problem at Trinidad and an urgent need for measures to deal with it. The problems remaining to be resolved with respect to the proposed reservoir project pertain to the effect that its operation would have on water supplies which otherwise would be available for storage in the John Martin Reservoir and for use in Colorado and Kansas under the terms of their compact.
>
> "At their meeting on July 12, 1955, the Arkansas River Compact Administration adopted the following motion:

> 'That the Arkansas River Compact Administration approves the flood-control project on the Purgatoire River subject to an operating procedure to be approved by the affected water users in Colorado and Kansas, the State of Kansas and the administration.'
>
> "I concur in the action taken by the administration and hereby modify the position of the State of Kansas with respect to the proposed Purgatoire River project to conform to the views of the Arkansas River Compact Administration, as expressed in the motion quoted above." Jt. Exh. 34 at XVI.

The Trinidad Project was authorized by the 85th Congress under Public Law 85-500, enacted on July 3, 1958. The authorizing language is part of an omnibus act and consists of only a single sentence in the lengthy act that provides for the construction and preservation of a large number of public works throughout the country. The brief provision on the Trinidad Project reads:

> "The project for the Trinidad Dam on Purgatoire River, Colorado, is hereby authorized substantially in accordance with the recommendations of the Chief of Engineers in House Document Numbered 325, Eighty-fourth Congress, at an estimated cost of $16,628,000." Jt. Exh. 35 at 309.

It is significant that the Congressional authorization did not make the project subject to an "operating procedure" to be approved by the State of Kansas and the Compact Administration, as conditioned in the Compact Administration's approval action. Congressional approval was based only upon the Chief of Engineer's

report. The "Operating Principles" on which the present Kansas claim rests were not adopted until 1967.

C. The 1961-1964 Operation Studies.

After the Trinidad Project was authorized in 1958, Congress appropriated funds for further planning studies to be conducted by the Bureau of Reclamation, but limited to the irrigation function of the project. Jt. Exh. 24a at 1-2. The studies were to "firm up" the findings of the 1953 Review Report of the District Engineer. Jt. Exh. 24b, Appendix A at 1. These studies were based upon the following reservoir space allocations: 51,000 AF for flood control, 20,000 AF for irrigation, 39,000 AF for joint use (i.e., for irrigation and sediment accumulations), and 4,500 AF for fish and recreation. Jt. Exh. 24a at 2. The total capacity of the reservoir was thus reduced from the 140,700 AF submitted to Congress to 114,500 AF. Allocations for the various functions were also modified. Flood control capacity was slightly increased, fish and recreation capacity was added, while the allocation for storage of irrigation water was substantially cut.

The initial Bureau studies, completed in 1961, assumed an equal sharing of the project water supply among the various irrigation ditches. Jt. Exh. 24b, Supplement to Appendix A at 1. This concept proved unacceptable to the local Purgatoire River Water Conservancy District. The District maintained that the study should be modified to take into account senior water rights, including the Model Land and Irrigation Company, which was providing the storage right. *Id.* This was done, and revised operations studies were completed in 1964,

including the development of detailed Operating Principles and Criteria. Jt. Exh. 24a.

The Bureau's 1961-64 studies recognized the prohibition in the Arkansas River Compact against a material stateline depletion but, subject to that limitation, stated that the conservation capacity of the reservoir would be used to regulate the flows of the Purgatoire River ". . . for maximum beneficial use of crops grown within the project area." Jt. Exh. 24b, Appendix A at 5. The water supply analysis in these studies was based upon a 33-year period, 1925-57, which was judged to be indicative of future conditions. Jt. Exh. 24a at 13. The project area consisted of 19,717 acres of irrigable land to be served by the eleven existing ditch systems. *Id.* at 2. The acreage limit of 19,717 acres called for the retirement of 5,975 acres of poor quality Class 6W lands, and the transfer of their water rights to 6,543 acres of idle, but more productive, irrigable lands. *Id.* at 2-4. Project diversions were to be limited to actual requirements (the so-called "ideal crop requirements") for the 19,717 acres of irrigable lands. *Id.* at 17; Jt. Exh. 24b, Appendix A at 7; RT Vol. 19 at 12-14 (Oct. 24, 1990). Operation of the project was expected to provide an additional effective crop irrigation supply averaging 6,760 AF annually. This improvement was expected to increase the average effective headgate irrigation supply from 61% of ideal requirements to 81.9%, and the crop supply from 74% of consumptive use requirements to 89%. Jt. Exh. 24b, Appendix A at 8; Supplement to Appendix A at 7.

As proposed in the original 1953 Review Report of the District Engineer, the 1961-64 studies assumed that

the 20,000 acre-foot storage decree for the Model reservoir would be transferred to Trinidad Reservoir, even though the existing capacity of the Model reservoir was on the order of only 6,200 AF. Jt. Exh. 24a at 2, 8; Jt. Exh. 24b, Appendix A at 2. Winter flows historically diverted for winter irrigation would also be stored. Jt. Exh. 24a, Appendix A at 2. Storage of winter water, however, was to be under the Model storage decree, and charged against that right. Jt. Exh. 24b, Appendix A at 6; Jt. Exh. 23 at 2, 11.

Based upon these operating conditions, it was assumed in both the 1961 and the revised 1964 studies that the Trinidad Project could be accomplished ". . . under the provisions of Colorado law and the Arkansas River Compact without adverse effect on downstream water users and the inflow to John Martin Reservoir." Jt. Exh. 24b, Appendix A at 7, 71. The 1964 study actually predicted a slight average increase of 400 AF annually in the inflow to John Martin as a result of the project. Jt. Exh. 24a at 22 (Table 8). This increase in downstream flow was expected to occur from more stable return flows, a decrease in channel losses during flood periods, and a small reduction in John Martin spills. *Id.* at 21.

III.

THE OPERATING PRINCIPLES

A. Approval of the Operating Principles.

As part of the 1964 studies, proposed Operating Principles were developed and included as Appendix A to

that report.[3] Jt. Exh. 24a. The Operating Principles were submitted for review and tentatively approved by the Corps of Engineers, the Colorado Water Conservation Board, and the Purgatoire River Water Conservancy District. *Id.* at 23. In addition, the proposed Operating Principles were reviewed by the Kansas members of the Compact Administration and the Kansas Water Resources Board. *Id.*; Jt. Exh. 42.

On December 30, 1966, Governor William H. Avery of Kansas wrote to H. P. Dugan, Director of Region 7 of the Bureau of Reclamation, stating that the report on the Trinidad Project had been considered by various Kansas agencies and users, and acknowledging that the Bureau of Reclamation had also provided additional information on the effects of the proposed project on downstream water supplies. On the basis of this information, he stated:

> ". . . [T]he Water Resources Board advises that in its judgment, the proposed Trinidad Project will not materially add to the depletion of the water supply of the Purgatoire River and to John Martin Reservoir providing that the project is operated in strict conformity with the guidelines used in the investigation and with the operating principles amended to incorporate the following conditions. . . ." Jt. Exh. 42.

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[3] The report also included certain "Operating Criteria" for the Purgatoire River Water Conservancy District. These criteria included more detailed provisions for the operation of the Trinidad Project, but were not submitted to the Compact Administration for approval. They are, nonetheless, incorporated into the repayment contract between the Purgatoire District and the Bureau of Reclamation. Jt. Exh. 39, Exhibit B.

Governor Avery then set forth five Kansas conditions, of which numbers 2, 3 and 4 may be relevant to the present issues:

> "1. All inflows over established Colorado water rights (1156.05 cfs) be designated flood flows and released as promptly as downstream conditions permit. The only time water so designated may be stored in the conservation pool will be when John Martin Reservoir does not have the capacity to store additional water.
>
> "2. Any subsequent amendment of the operating principles should be subject to review and approval of the same interests as provided for in the original procedure.
>
> "3. Assurances that there will be no significant increase in water use which would result in a depletion of water yield to other Colorado and Kansas water users.
>
> "4. That 5 years after beginning operation of the Trinidad Reservoir for irrigation purposes, the operating principles be reviewed to determine the effect, if any, the operation has had on other Colorado and Kansas water users and the principles amended as necessary. Each 10 years thereafter reviews should be provided with amendments as needed.
>
> "5. All operating records be open for inspection by any qualified representative of the Arkansas River Compact Administration." Jt. Exh. 42.

If the five Kansas conditions were accepted by the Bureau of Reclamation and the Purgatoire River Water Conservancy District, Governor Avery wrote that Kansas

would be in a position to approve the amended Operating Principles and to support completion of the project. *Id.*

On January 26, 1967, the Purgatoire District adopted a resolution approving the five conditions proposed by Kansas, having found that they were "consistent with the manner of operation of said project as contemplated by this Board." Jt. Exh. 43. By letter dated February 1, 1967, the Regional Director of the Bureau of Reclamation advised Governor Docking of Kansas that the Bureau concurred in the resolution adopted by the Purgatoire River Water Conservancy District, ". . . and will be governed accordingly in implementing the 'Operating Principles.' " Jt. Exh. 44. In a separate letter to John M. Dewey, Kansas Water Resources Board, the Bureau confirmed its "commitment" to Kansas that the Trinidad Project would be operated "strictly in accordance with the 'Operating Principles' " as amended by the five Kansas conditions. Jt. Exh. 23, Appendix IV.

On March 20, 1967, at the suggestion of the Kansas Water Resources Board, the Bureau's Regional Director sent Governor Docking a letter setting forth the Operating Principles and the five Kansas conditions in one document. Jt. Exh. 46. Governor Docking responded to the Bureau, signifying his approval of the amended Operating Principles, and stating that Kansas would offer no objection to completion of the Trinidad Project ". . . subject to the acceptance of the amended principles by the Arkansas River Compact Administration." Jt. Exh. 45.

The Operating Principles had been included as part of the repayment contract between the United States and

the Purgatoire River Water Conservancy District for the reimbursable costs of the Trinidad Project. Jt. Exh. 39. The contract provides, in part, that the regulation, storage and release of the waters of the Purgatoire River will be subject to the Operating Principles. *Id.* at 4, 14.

Against this background, the Trinidad Project and the Operating Principles came before the Compact Administration at its meeting on June 6, 1967. In attendance were representatives of the Corps of Engineers, Bureau of Reclamation, United States Geological Survey, Purgatoire River Water Conservancy District, and several of the downstream Arkansas Valley ditch companies. The discussion, as reflected in the minutes, was relatively brief and centered on the relationship between the five Kansas conditions and the original draft of the Operating Principles.

In particular, the question was whether the five-year review required under the Kansas conditions would prevail over the ten-year review provided in Part F of the original Operating Principles. Mr. Ogilvie, the representative of the Bureau of Reclamation, said that it would. Jt. Exh. 19, June 6, 1967 Minutes at 6. More generally, a Colorado member of the Compact Administration assured the meeting that any amendments such as the Kansas conditions would supersede the original document. *Id.* The Colorado member then moved that the Operating Principles be approved ". . . with the understanding that the amendments take precedent [sic] over the original operating principles as presented." *Id.* The Kansas members thought that it would be "less clumsy" to redraw the principles and incorporate the amendments into a single document. After a recess, the Colorado

member withdrew his original motion with the following substitute action:

> "Moved that the document of March 20, 1967 submitted to Governor Docking and signed by H. P. Dugan and counter-signed by Dr. Donnelly be approved by the Arkansas River Compact Administration. Mr. Green seconded the motion and after some discussion the motion was carried by vote of the states. The documents are attached as Appendix A." *Id.* at 7.

This letter from Bureau of Reclamation Director Dugan, which was the subject of the Compact Administration action, expressly recognized the desirability of including the Operating Principles and the five Kansas conditions "clearly in one document so as to avoid any misunderstanding," and he did so in that letter by adding the five Kansas conditions to the end of the Operating Principles. Jt. Exh. 46.

In the briefs of counsel, there is considerable argument over the nature of the action taken by the Compact Administration, that is, whether such action constitutes a binding Compact rule or regulation, procedure, or action to implement the Compact, or whether it is only a finding that becomes prima facie evidence, or whether it is none of these. The minutes themselves do not specifically characterize the nature of action in any way that assists in this inquiry.

B. Operation of the Trinidad Project, 1979-84.

Construction of Trinidad Reservoir was completed and it was ready to impound water on January 1, 1977. Jt.

Exh. 23 at 4. However, litigation within Colorado delayed any substantial storage until March, 1979. Since May of 1979, most of the project irrigation canals have been delivering water regulated by Trinidad Reservoir. *Id.*

During the 1979-84 period, Colorado's Division 2 Engineer permitted the Purgatoire River Water Conservancy District to make an accounting transfer of any water stored under the Model right that remained in storage at the end of the water year into the "joint-use pool." Jt. Exh. 23 at 9-11. This was the 39,000 AF of capacity assigned to "irrigation and sediment accumulation," and was in addition to the 20,000 AF allocated solely to "irrigation." *Id.*, Appendix I at 2. This practice is known as "rollover," and permitted storage, during the subsequent year, of any part of the full 20,000 AF Model right that was not stored in the previous year. The Division 2 Engineer also permitted the Purgatoire District to store winter inflow to Trinidad Reservoir during the non-irrigation season under the direct flow priorities of the project ditches, and did not account for such storage against the Model storage decree. Jt. Exh. 23 at 11. The Kansas complaint does not specifically refer to such storage of winter water, but evidence on the alleged violation was introduced by Kansas without objection from Colorado or the United States. I therefore treat the winter water storage issue as a part of the present motion.

In its 1988 report, the Bureau of Reclamation stated that these two practices (rollover and winter water storage) were contrary to the assumptions underlying the 1961-64 studies. The Bureau stated:

> "These operation studies [the 1961-64 studies] were based on the assumption that any water remaining under the Model right would be included in the following year's entitlement to storage and that the winter storage would be stored under the Model right. The studies concluded that the Project would not, on an average annual basis, cause additional depletion to the inflow to John Martin Reservoir." Jt. Exh. 23 at 11; RT Vol. 18 at 68 (Oct. 23, 1990).

From a review of House Document No. 325, and the 1961-64 studies, the Bureau said there is "little doubt" that the Bureau personnel formulating the irrigation components of the project "did not intend that water stored under the Model right be transferred out of the Model Right or that winter water be stored under any right but the Model right." Jt. Exh. 23 at 11.

The Bureau of Reclamation concluded in its 1988 report that the practices of rollover and winter water storage outside of the Model decree constituted a "departure from the intent of the operating principles." *Id.*

Kansas complained immediately about the way Trinidad Reservoir was being operated. A special meeting of the Compact Administration was called by Kansas officials on June 30, 1980. Kansas representatives stated that the joint use capacity account had been illegally used; that such capacity was to be used only for sedimentation, the purchase of additional downstream rights, and the capture of available water in priority if John Martin Reservoir were spilling. Jt. Exh. 19, June 30, 1980 Minutes at 3.

Carl Bentrup, one of the Kansas representatives to the Compact Administration, who was the only member who had participated in the Administration's 1967 decision, explained that the intent of the Operating Principles, as approved by the Administration in 1967, was that no more than 20,000 AF of water would ever be stored behind Trinidad Dam, unless John Martin were overflowing or additional downstream water rights were purchased. *Id*. The Compact Administration found that in October, 1979 the Purgatoire River Water Conservancy District had transferred 18,290 AF stored under the Model reservoir right into the joint use pool, and in the following year, when the Model storage right came into priority, 20,000 AF of additional water were stored. *Id*. at 7-8; RT Vol. 17 at 100-101 (Oct. 22, 1990).

On the basis of the Kansas charges, the Compact Administration authorized an investigation of the Trinidad Project, but the issues could not be resolved at the Compact Administration level.[4] Jt. Exh. 19, June 30, 1980 minutes at 7-8. Finally, in December, 1984, the Compact Administration asked the Bureau of Reclamation to conduct a review of Trinidad Reservoir operations with the participation of both States and other interested parties. Jt. Exh. 19, Dec. 11, 1984 Minutes at 10; RT Vol. 17 at 105 (Oct. 22, 1990). This request also coincided with Kansas' Condition 4, which called for a five-year review. The

[4] See Decision of Special Master on Colorado Motion to Stay, October 21, 1988, for some of the Administration history during this period of time. Kansas continued after 1980 to register complaints about the Trinidad operations. Jt. Exh. 23 at 4.

results of the Bureau's study are found in a report entitled "Review of Operating Principles," dated December 1988 and admitted into evidence as Joint Exhibit 23.

C. Bureau of Reclamation Review of Trinidad Project Operations, 1979-84.

In performing its review of 1979-84 project operations, the Bureau of Reclamation first developed a computer model to reconstruct its 1961 report. Jt. Exh. 23 at 12. The model and input data were then modified to fit the parameters of the 1964 study. *Id*. The computer-based reconstruction of the 1964 study became the Bureau's "baseline" study, denominated "1H." *Id*. It simulates operation of the Trinidad Project over the 1925-57 period, in strict conformity with the Operating Principles. *Id*. at 17; RT Vol. 18 at 24 (Oct. 23, 1990). Study "5H" also simulates operation of the Trinidad Project over the 1925-57 period, but alters the baseline criteria to assume the practice of rollover and the storage of winter water without charging such storage against the Model right. Jt. Exh. 23 at 17-18; RT Vol. 18 at 24, 27 (Oct. 23, 1990).

The Bureau compared both of these simulations against a "without project" condition, that is, the storage of only 6,000 AF under the historic Model storage decree. Jt. Exh. 23 at 17. The results of these comparisons are set forth in Table 5 of Jt. Exh. 23 at 21-22. Assuming that the Trinidad Project was in operation during the 1925-57 period under conditions of the 1964 study (i.e., no rollover and no winter water storage outside of the Model right), Study 1H shows that the inflow to John Martin would have increased by an average of 1,000 AF per year.

Jt. Exh. 23 at 21, Table 5. Assuming the practice of roll-over and the storage of winter water, the estimated inflow to John Martin Reservoir becomes less, but it still shows an average increase of 300 AF annually. *Id.* It is interesting to note that this 1988 computerized simulation demonstrates the same slight increase of inflow into John Martin as the 1961 study, although the 1988 results assumed a violation of the Operating Principles, whereas the 1961 study assumed strict compliance. *Id.*, Table 5, 1961 column.

The 1988 Bureau Report includes numerous other comparison "runs," as they are sometimes called. Each of these additional computer simulations varies certain of the assumptions used. For example, both the baseline 1H study and run 5H assumed that the storage capacity of the joint use pool was 19,500 AF. This figure represents the average capacity available over the life of the project, assuming some gradual filling through sedimentation, and it is the same capacity that was utilized in the Bureau's 1961-64 studies. RT Vol. 18 at 31-32 (Oct. 23, 1990); Jt. Exh. 23 at 7. However, while run 5H39 uses operational criteria similar to run 5H, it assumes that the capacity of the joint use pool is 39,000 AF, rather than 19,500. Under run 5H39, therefore, the full capacity of the joint use pool is deemed to continue to be available, without reduction due to sedimentation. While this assumption seems unrealistic, use of the larger storage capacity nevertheless causes an average reduction of inflow to John Martin Reservoir of only 100 AF annually. Jt. Exh. 23 at 21, Table 5.

The full array of the different comparison studies and assumptions is described on pages 17-20 of Joint Exhibit

23, with the results shown on Tables 5, 6, 8 and 9. The Bureau concluded that "under most of the practices and conditions studied," the inflow to John Martin Reservoir would be larger than that which would have occurred without the project. Jt. Exh. 23 at 28-29. These various studies of the 1925-57 period, according to the Bureau, ". . . provide a sound basis for assessing future impacts and evaluating proposed amendments." *Id.* at 28. The Bureau's overall conclusion on the future impact of the practice of rollover and storage of winter flows is stated as follows:

> "The transfer of water from the Model Right and the storage of winter water under the direct flow decrees, either singularly or collectively, *will not cause the future usable inflow to John Martin Reservoir to be less with Trinidad Project in operation than it would have been without the Project.* These practices will, however, result in less inflow to John Martin Reservoir than would occur if the water rights were administered in accordance with the intent of the Operating Principles." Jt. Exh. 23 at 55. (Emphasis added.)

Turning to the Kansas assessment of these various studies, Brent E. Spronk, Kansas' expert witness on this subject, testified that the Bureau's Study 5H39NOWBP best contrasts the actual operation of the Trinidad Project (i.e., including rollover and winter storage) with historical conditions RT Vol. 20 at 66, 68-69 (Oct. 25, 1990); Jt. Exh. 23 at 20. Spronk acknowledged that whether this run would best indicate future impacts would depend upon how fast the sediment portion of the reservoir fills and the outcome of a legal dispute affecting certain winter bypasses. RT Vol. 20 at 69-70 (Oct. 25, 1990). Even so, this

study shows that the average inflow to John Martin Reservoir would be reduced by virtue of the Trinidad Project by only 200 AF per year. Jt. Exh. 23 at 22, Table 5. Given the study assumptions as well as the results, I do not believe that it demonstrates a material depletion within the meaning of the Arkansas River Compact.

The Bureau's 1988 Report also includes three case studies for the years 1979 through 1984 during which the Trinidad Project was in actual operation. The Bureau found that during this period of time, the practice of rollover and the failure to charge winter storage against the Model decree resulted in net additional water storage in Trinidad Reservoir of 23,855 AF. Jt. Exh. 23 at 12. This is not to say, however, that the inflow to John Martin Reservoir was reduced by an equivalent amount. The three case studies were undertaken to determine that impact on John Martin. *Id*. For the initial 1979-84 period, they were an effort to compare what was expected to occur, under the 1961-64 studies, with what actually happened. RT Vol. 17 at 117-18 (Oct. 22, 1990).

In each of the three cases, the Bureau simulated project operations in strict compliance with the Operating Principles, that is, without transfer of storage under the Model Right into the joint use pool, and without storage of winter water outside of the Model Right. Jt. Exh. 23, Appendix II at 26. In both Case 1 and Case 2, the Bureau assumed irrigation of the full project area of 19,717 acres, and used the 1961 study criteria to determine the headgate diversions and return flows from such irrigation. Thus, diversions were not actually measured but rather were calculated upon the "ideal irrigation requirement"

for all of the project lands. RT Vol. 17 at 115 (Oct. 22, 1990).

The actual diversions during the 1979-84 period exceeded these "ideal" requirements, which called for increased irrigation efficiencies in order to minimize impacts on downstream users. Jt. Exh. 24a at 17; Jt. Exh. 24b, Appendix A at 7; Jt. Exh. 23 at 42-44; RT Vol. 18 at 36-37 (Oct. 23, 1990). While these studies assumed that the 19,717 acres of project lands were irrigated, this also was not true in fact. Because it was necessary to rehabilitate some of the distribution systems, a "substantial part" of the project lands was not irrigated during the early years. Jt. Exh. 23 at 4, 25, 28. At the same time, some of the Class 6W lands that were to have been retired did receive water, although the Bureau concluded this use had no impact on downstream users. *Id*. at 55. Under Case 3, the Bureau simply used the actual amount of irrigation diversions during the study period. *Id*., Appendix II at 26.

The results of the three case studies are shown on Table 4 at page 16 of Joint Exhibit 23. Case 1 shows a net increase in the flows into John Martin of 3,500 AF over the study period of 1979-84 by virtue of the Trinidad operations. Case 2 shows a net decrease of 3,600 AF. Finally, Case 3 shows a net decrease of 11,600 AF.

The Bureau states that Case 3 ". . . best represents the actual impacts resulting from the departures from the intent of the Operating Principles." Jt. Exh. 23 at 25. Yet from the standpoint of "injury to downstream users," the Bureau concludes that Case 1 gives the "most reasonable results." *Id*. at 26. The most significant Bureau conclusion

is that none of these three case studies predicts future impacts:

> "The studies run on the operation during the 1979-84 review period *do not* provide a sound basis for assessing the future impacts that would be caused by transfer of water out of the Model Right and storage of winter water under the direct flow rights. These studies are also not useful for evaluating proposed amendments to the Operating Principles because the full project acreage was not irrigated during the review period, these studies are not representative of expected future conditions. Since the studies on the review period do not compare actual operation to a 'without project' condition, they cannot be used to determine what, if any, injury the Project may have on downstream water users." Jt. Exh. 23 at 28. (Emphasis in original.)

The Bureau states that sufficient information was not available to make a "without project" comparison for the 1979-84 period.

> "However, none of the three studies gives a true picture of injury because they do not compare the actual condition to a 'without project' condition. We investigated making the 'without project' comparison and concluded that there was not sufficient information available to make meaningful comparisons." *Id.* at 26.

The Bureau does acknowledge, however, that the practice of rollover and the storage of winter water outside of the Model right during the 1979-84 review period ". . . has depleted the *usable* inflow to John Martin Reservoir when compared to the inflow that would have occurred had the Trinidad Project been in accordance

with the intent of the Operating Principles." *Id.* at 55. (Emphasis in original.)

Finally, the Bureau recommended that the transfer of water from the Model storage right, and the storage of winter flows, be discontinued until such time as the Operating Principles are amended to recognize these practices. *Id.* at 57. Dr. Jeris Danielson, Colorado State Engineer, turned this recommendation into a directive. On April 27, 1989 he wrote to the Purgatoire River Water Conservancy District, stating in part:

> "I have been advised by legal counsel for the State of Colorado that the Bureau of Reclamation's new interpretation of the Operating Principles is likely to be viewed as persuasive with regard to these practices. Therefore, although the Operating Principles do not explicitly adopt the criteria used in the operation studies performed by the Bureau of Reclamation, I have been advised that until such time as the Operating Principles are amended or a court of competent jurisdiction determines that these practices are not a departure from the intent of the Operating Principles, I should administer the Project water rights consistent with the Bureau of Reclamation's most recent interpretation of the Operating Principles." Jt. Exh. 52.

He concluded by directing that, effective November 1, 1988, Trinidad Reservoir would be administered without rollover or storage of winter water outside of the Model right. *Id.*

It appears that this directive is currently being followed, although a state action has been filed to amend relevant water rights decrees.[5]

[5] In the summer of 1990, shortly before commencement of this trial, Kansas filed a Petition for Writ of Prohibition asking the Supreme Court to restrain Case No. 88CW21 in the Colorado District Court, Water Division No. 2. That case had been brought by the Purgatoire River Water Conservancy District and involved the Operating Principles for the Trinidad Project. On September 17, 1990, an affidavit by M.E. MacDougall, the Purgatoire District's attorney, was filed in the prohibition proceeding in response to my request for information concerning the nature of the state court suit. In his affidavit Mr. MacDougall represents that the purpose of the suit is to obtain modification of the state court decree which authorized moving the location of the Model storage right to the Trinidad Project. That decree was entered on April 15, 1965 in Civil Action No. 19793 in the District Court for Las Animas County. (Certain later decrees are also pertinent. See *Purgatoire River Water Conservancy Dist. v. Kuiper*, 197 Colo. 200, 204-205, 211, 593 P.2d 333.) The 1965 decree had provided that storage at the new location would be conducted in accordance with House Document No. 325 "as implemented" by the Operating Principles. Mr. MacDougall concedes that the state court does not have jurisdiction to amend the Operating Principles; it appears that adjustment of the state court decrees is being sought in case the Operating Principles are amended.

On the first day of trial herein, Kansas withdrew its request for prohibition, and the Conservancy District since then has tried to have Case No. 88CW21 set for trial. However, other parties have objected on the basis of the pendency of this Supreme Court litigation. The latest information received on this subject is a May 8, 1992 letter from the Clerk of the Water Court stating that Case No. 88CW21 "is presently on a 'hold' status until a ruling is made in *Kansas v. Colorado*."

IV.

ANALYSIS AND DISPOSITION OF THE ISSUES

A. The Kansas Legal Theory.

The legal theory now being advanced by Kansas in support of its Trinidad claim is not apparent from the face of the complaint. The Kansas complaint centers around the allegation that Colorado and its water users ". . . have materially depleted the usable and available stateline flows of the Arkansas River" in violation of the Arkansas River Compact. Complaint, para. 7. Paragraphs 8 through 10 of the complaint specify certain actions which have caused or have allowed the material depletions to occur. The only direct mention of the Trinidad Project comes in Paragraph 12, where it is listed among several "alleged Compact violations" which the Compact Administration undertook to investigate in 1985, pursuant to Article VIII-H of the Compact. The specific reference is to "Colorado's artificially transferring water from the storage pool in Trinidad Reservoir to the sediment pool and then refilling the storage pool to the detriment of downstream users."

The brief filed by Kansas in the Supreme Court in support of its motion to have the court exercise its original jurisdiction carries a more general reference to the Trinidad Project, but still links the Trinidad issues to a material depletion in river flows. Kansas states there that the 1985 investigation by the Compact Administration was to determine whether ". . . the operation of the Trinidad dam and reservoir project," among other actions in Colorado, caused a material depletion in the waters of the Arkansas River. Kansas Brief at 4. No mention of the Operating Principles for the Trinidad Project appears in

the Complaint or any of the accompanying documents. Nor is there any suggestion that a claim or cause of action is being pursued based upon a violation of the Operating Principles only.

During the trial, however, Kansas presented quite a different legal concept in support of its Trinidad claim. The Kansas trial presentation rested upon a showing that the Operating Principles were violated, and the assertion that such violation *per se* constituted a Compact violation.[6] Kansas Supplemental Statement at 17. Kansas attempted to sever its Trinidad claim from any need to show injury or a material depletion in the usable flows of the Arkansas River available to Kansas. During oral argument, counsel for Kansas summarized the point:

> "Kansas believes that the Operating Principles are binding on both parties, that a departure from the Operating Principles is a violation of the Compact, regardless of injury. The test is not whether there has been a material depletion, but rather whether there has been a departure from the Operating Principles." RT Vol. 94 at 19, 38-39 (March 10, 1992).

It is the position of Kansas that the Operating Principles were properly adopted by the Compact Administration under authority of Article VIII-B of the Compact, and

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[6] This opinion does not address the possible question of whether Kansas has a claim for violation of the Operating Principles that is independent of the Compact, that is, a cause of action based upon a separate agreement with Colorado, or as a third party beneficiary under the repayment contract, or otherwise.

accordingly are binding upon the State of Colorado. Kansas Brief in Opposition to Colorado's Motion at 4-5, 10, 28; RT Vol. 94 at 26-27 (March 10, 1992). Any departure from the Operating Principles, according to Kansas, ". . . is therefore a violation of the Compact." Kansas Brief in Opposition to Colorado's Motion at 28. Depletions from such "Compact" violations were quantified by comparing the flows into John Martin Reservoir "as they would have occurred under the Operating Principles with the flows that occurred under actual operations." *Id.*

Under the evidence in this case, such a measure of damages would afford Kansas significant benefits from the project, as opposed to merely protecting Kansas and other downstream users against material depletions. Kansas asserts that a without-project analysis, that is, comparing the flows actually received with those that would have occurred in the absence of the project, is not appropriate or consistent with applicable law. *Id.* at 18.

B. The Kansas Testimony and Evidence.

Much of the Trinidad evidence was documentary, introduced by both States in the form of joint exhibits. These exhibits include the legislative history of the project in Congress, the Bureau's 1961-64 studies, development and approval of the Operating Principles and the five Kansas conditions, consideration of the project by Kansas and the Compact Administration, and the Bureau's review of the initial project operations from 1979 through 1984. Kansas also offered the testimony of Brent E. Spronk, one of its chief expert witnesses.

Spronk quantified the depletions of inflow into John Martin Reservoir, according to the Kansas legal theory. That is, using the Bureau's Case 1 and Case 3 Studies with certain adjustments, he calculated monthly depletions of the inflow to John Martin Reservoir, based upon the differences between actual inflows during 1979-84 and those that would have occurred under strict compliance with the Operating Principles. In making this analysis Spronk looked only at the months in which depletions occurred, and then totaled the amounts of such depletions. RT Vol. 17 at 133-36, 139-40 (Oct. 22, 1990); RT Vol. 18 at 62 (Oct. 23, 1990). He deliberately chose not to offset those depletions by the many months during which the Trinidad Project increased inflows into John Martin.

On this basis, Spronk concluded that during the 1979-84 period the total additional inflow into John Martin Reservoir, under strict compliance with the Operating Principles, would have been between 24,500 AF and 27,500 AF. RT Vol. 18 at 57 (Oct. 23, 1990); Kan. Exh. 580. In accordance with the allocation formula the parties now use (the 1980 Resolution), Kansas would have been entitled to 40% of this additional storage. RT Vol. 18 at 71, 117-18 (Oct. 23, 1990).

Spronk's testimony reflects the Kansas legal position that the Operating Principles have to be complied with each month, without considering averages. RT Vol. 17 at 139-40 (Oct. 22, 1990). According to this view, a violation of the Operating Principles is not to be offset by additional flows provided at some other time. The result, of course, is to allot to Kansas more water than it would

have received if the Trinidad Project had not been constructed.

On cross-examination, Spronk acknowledged that his analysis would not be appropriate if the Trinidad operations were looked at in terms of injury to Kansas, instead of merely considering the reductions caused by the practices of rollover and winter storage. RT Vol. 18 at 72 (Oct. 23, 1990). In that event, he agreed, the storage available in John Martin Reservoir would have to be taken into account. He testified:

> "In terms of injury, I think you would have to look at whether the shortages of water that were made to the inflow of John Martin caused at any time a reduction in the quantity of water available to Kansas water users at the time that they demanded or needed water. In that light, if the Kansas account at that time did not go to zero and replacement for some previous depletion had been made – in other words, there is an increase in a month – in terms of injury, the injury may in fact be mitigated by the accretions that occur after depletion occurred; or visa versa if there is accretion before the depletion, that would prevent injury so long as the magnitudes are the same and so long as the amounts of water that are available are there when Kansas would have otherwise needed it and called for it." *Id.*

Kansas presented no specific evidence that coupled the depletions and accretions from project operations to the water stored in John Martin Reservoir, or to any injury to Kansas. Nor did Spronk make a without-project analysis. That is, he did not compare the actual inflows into John Martin Reservoir for the 1979-84 period of

operations with flows that would have occurred if the Trinidad Project had not been built. *Id.* at 74. He testified that such study was not necessary ". . . to determine whether depletions had occurred as a result of the departure from the Operating Principles." *Id.* However, he added that it would be difficult to make an accurate without-project analysis for 1979-84 because of uncertainty in estimating diversions in the absence of the project. RT Vol. 19 at 11, 14 (Oct. 24, 1990). In the final analysis, however, Kansas offered no evidence, apart from the Bureau studies, to show that the actual operation of the Trinidad project caused it to receive less water than under historical, without-project conditions. As already noted, the Bureau had concluded that the practices of rollover and storage of winter water would not cause ". . . the future usable inflow to John Martin Reservoir to be less with the Trinidad Project in operation than it would have been without the Project." Jt. Exh. 23 at 55.

C. The Nature of the Compact Administration's Action in Approving the Operating Principles.

Kansas' Trinidad claim rests upon establishing three propositions: first, that the action of the Compact Administration in approving the Operating Principles was a proper exercise of authority under Article VIII-B of the Compact and is therefore binding upon Colorado; second, that the Operating Principles are enforceable apart from showing a material depletion in usable river flows available to Kansas; and third, that injury from a violation of the Operating Principles may be established by considering only months in which depletions resulted,

without taking into account offsetting accretions in other months. It is open to question whether Kansas held the same legal theories when the complaint was framed in 1985, but nonetheless, the Trinidad issues were tried on this basis.

The Compact Administration is specifically given power to adopt by-laws, rules and regulations consistent with the Compact; to prescribe procedures for the administration of the Compact; and to perform all functions required to implement the Compact. Article VIII-B(1)(2)(3). Kansas argues that the action of the Compact Administration taken on June 6, 1967 comes within this Article, emphasizing primarily that the Administration's approval of the Operating Principles effectively makes them valid rules and regulations with the same binding force as the Compact. Kansas Supplemental Statement at 11, 14-15.

The Administration by-laws require notice and publication before rules and regulations can be adopted. These requirements were not met here, but Kansas cites authorities to the effect that parties with actual notice (Colorado) cannot complain about lack of publication. See *United States v. Floyd*, 477 F.2d 217, 222 (10th Cir.) *cert. denied*, 414 U.S. 1044 (1973); *United States v. Aarons*, 310 F.2d 341 (2nd Cir. 1962); *Tearney v. National Transp. Safety Bd.*, 868 F.2d 1451 (5th Cir.), *cert. denied*, 493 U.S. 937 (1989).

Recognizing that the action actually taken by the Administration was a somewhat awkward motion to approve the letter from the Bureau to the Kansas Governor in which the Operating Principles and the five Kansas

conditions were stated, Kansas also submits authorities stating that it is the substance of an action that must be judged, not the label or lack thereof. See *Columbia Broadcasting System v. United States*, 316 U.S. 407, 416 (1942); *A.F. of L. v. National Labor Relations Bd.*, 308 U.S. 401, 408 (1940); *Lewis-Mota v. Secretary of Labor*, 469 F.2d 478, 481-82 (2nd Cir. 1972); *Dresser Industries, Inc. v. Commissioner of Internal Revenue*, 911 F.2d 1128, 1138 (5th Cir. 1990).

However, Kansas' problem is not the lack of forgiving judicial precedents which permit a court to overcome technical deficiencies. Rather, it is the plain fact that the Compact Administration did not do, nor intend to do, what Kansas now claims. The Operating Principles were developed by the Bureau of Reclamation as part of its 1964 study, and came to symbolize the conditions under which that study was made. Those Principles were widely accepted by all other interested parties well before being considered by the Compact Administration. In fact, they had already been included in the February 10, 1967 signed repayment contract between the Bureau of Reclamation and the local Purgatoire River Water Conservancy District. The Operating Principles clearly were not rules of the Compact Administration in any normal sense.

The Governor of Kansas also gave his approval before the Compact Administration took up the matter. Jt. Exh. 45, dated April 11, 1967. His approval was subject to the "acceptance" of the "amended principles" by the Compact Administration. *Id*. The amendment, of course, referred to the addition of the five Kansas conditions. The relationship of those conditions to the original Operating Principles was essentially the only aspect of the Trinidad

Project discussed by the Compact Administration at its June 6, 1967 meeting. Jt. Exh. 19, June 6, 1967 Minutes at 5-7. The acceptance of the amended Operating Principles at that meeting appears to have been the final local clearance needed, as a practical matter, to permit construction of the project.

I have carefully examined the record presented here of the Compact Administration's consideration of the Trinidad Project. I find nothing to indicate that the Compact representatives of either State thought they were exercising binding authority under Article VIII-B. And the consequences of such authority, as argued by Kansas, make it less rather than more appropriate that such action should be implied.

Perhaps the fundamental flaw in the Kansas position can be seen most readily if the facts of this case are turned around. Assume that the Operating Principles were strictly observed, but nonetheless the actual Trinidad operations still caused a material depletion in the usable flows to Kansas users. Under the Kansas legal theory, the State of Kansas would have no recourse so long as the Operating Principles had been adopted by the Compact Administration pursuant to Article VIII-B. The agreement on the Operating Principles would supersede the Compact. During oral argument, this colloquy occurred:

> "Mr. Draper [counsel for Kansas]: Applying that to our situation here, I think it makes clear that Kansas is bound also by the Operating Principles. If it is – that is, when I say 'it,' I mean if the project operated consistent with those – I

think this case tells us directly that Kansas has no complaint under the Compact.

"Special Master: Even if there were a material depletion at the state line?

* * *

"Special Master: . . . If you tell me that you think Kansas is bound in the sense that if the Operating Principles were followed and a material depletion at the state line were to result that it would have no cause of action, haven't you in essence amended the Compact?

"Mr. Draper: No. The Compact Administration has implemented the Compact, your Honor." RT Vol. 94 at 43-44 (March 10, 1992).

Colorado disagrees with this Kansas view, and so do I.[7] Under the assumed facts, Kansas would permit the Compact Administration to write out of the Compact the critical Article IV-D requirement that no new development in Colorado may cause a material depletion in usable flows to Kansas users. Such action would not implement, but rather would amend the Compact. Of course, the Compact Administration was not delegated power to change the Compact. No matter what operational criteria are followed, that is, whether the project is operated in compliance with the Operating Principles, or not, or under appropriately modified Principles, the requirements of Article IV-D must still be met.

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[7] Counsel for Colorado acknowledged during oral argument that Kansas would still have the right to complain about material depletions caused by operation of the Trinidad Project, "even under the Principles." RT Vol. 94 at 8 (March 10, 1992).

Other provisions of the Compact also cast doubt on the "binding" nature of Compact Administration action. Article VIII-H charges the Administration with the responsibility to promptly investigate Compact violations. Its findings and recommendations "may" be reported to the State official charged with the administration of water rights for appropriate action, ". . . it being the intent of this Compact that enforcement of its terms shall be accomplished in general through the State agencies and officials charged with the administration of water rights." Moreover, any Compact Administration procedures involving John Martin are ". . . subject to the approval of the District Engineer in charge of said Project." Article VIII-B(2).

While still maintaining that the State of Colorado and its local conservancy district are bound by the Administration's approval of the Operating Principles, Kansas properly acknowledges that the United States is not. Kansas April 9, 1992 letter. Yet the Kansas train of logic, if indeed it were sound, would lead to precisely the opposite conclusion. Kansas argues that the Arkansas River Compact Administration is an interstate agency created by the Compact; that it is a "federal agency"; that it was expressly delegated certain powers by "federal statute" (i.e., the Compact); that its action in approving the Operating Principles was within its delegated authority, and designed to "implement federal law"; and that violation of a valid regulation is effectively a violation of the statute. Kansas Brief at 5, 10-11; Kansas Supplemental Statement at 10-11. The Kansas argument fails because the Compact Administration was never granted the

authority to bind either Colorado or the United States in the way that Kansas now claims.[8]

The Kansas legal theory on the binding nature of the Operating Principles also runs contrary to the review provisions contained in the Principles themselves. Originally they called for at least one review every ten years. The stated object of such reviews was to amend the criteria to obtain the ". . . optimum beneficial use of water as conditions change, operating experience is gained, and more technical data become available." Jt. Exh. 23, Appendix I at 11. The reference here to "optimum beneficial use" presumably means the same as it does in Article I on Objectives. There it is stated that the project plan provides for: "Optimum beneficial use of the available water for irrigation within the project area consistent with the protection of downstream non-project rights . . . ." *Id.* at 1. The five Kansas conditions shortened the first review period to five years, and added that the Operating Principles be reviewed ". . . to determine the

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[8] Earlier in this case, in ruling on pre-trial motions, I reviewed the history of the Compact negotiations and of its Congressional approval, with respect to the power of the Compact Administration over future federal development. I concluded that ". . . the historical record does not support Kansas' claim that the Compact negotiators intended to give the Compact Administration power to control future Federal operations on the Arkansas River." Report of Special Master re Winter Storage Motions at 16. Article IX of the Compact specifically protects the rights and jurisdiction of the United States over the waters of the Arkansas River basin, provided that the Chief of Engineers is "authorized" to operate the conservation features of John Martin in accord with the Compact, "with such exceptions as he and the Administration . . . may jointly approve."

effect, if any, the operation has had on other Colorado and Kansas water users and the principles amended as necessary." Jt. Exh. 42.

The first required five-year review has now been made. The Bureau found that the Operating Principles, indeed, fail to provide optimum beneficial use for irrigation in the Trinidad Project area; moreover, that modification of the Principles to allow rollover and winter storage would not reduce usable inflow into John Martin Reservoir below without-project conditions. Jt. Exh. 23 at 55. Yet the arguments now advanced by Kansas would give the State of Kansas an absolute veto over any modifications of the Operating Principles.

During oral argument, counsel for Kansas stated:

> "If any amendment [to the Operating Principles] is to be made, it is to be made by the Arkansas River Compact Administration. But until that amendment is made, they are in place and binding." RT Vol. 94 at 27 (March 10, 1992).

If a proposal to modify the Operating Principles were to be put before the Compact Administration, Kansas asserts that each State would hold an "absolute right to veto." Kansas Supplemental Statement at 10.

Kansas claims that its position is supported by Supreme Court decisions in the Pecos River litigation. *Texas v. New Mexico*, 462 U.S. 554, 77 L.Ed.2d 1, 103 S.Ct. 2558 (1983); 482 U.S. 124, 96 L.Ed.2d 105, 107 S.Ct. 2279 (1987). This argument is based in part on the fact that the Pecos River Compact uses the same language regarding findings made by the Pecos River Commission that is used in the Arkansas River Compact for findings made

by the Arkansas River Compact Administration.[9] These decisions, however, do not have the effect Kansas claims for them.

To begin with, the Pecos River Compact gives its Commission specific authority to make findings as to the deliveries of water at the New Mexico-Texas state line, and depletions caused by man's activities in New Mexico. Article V(d)(5),(6), Kansas Brief, Appendix, Item 2. Pursuant to this authority, the Pecos River Commission adopted as "findings of fact" a set of figures showing a cumulative shortfall at the state line of 53,000 AF over the period from 1950 to 1961. *Texas v. New Mexico*, 462 U.S. at 561. Although the Supreme Court accepted these findings, there is nothing to suggest that the Court felt required to do so merely because the Commission representatives of the two States had agreed. Kansas' argument in this respect relies on a statement by the Special Master in the *Texas* case to the effect that the Supreme Court "seems" to have regarded the Commission action as "dispositive." Kansas Brief, Appendix, Item 3 at 18. Elsewhere in his Report, however, *id.* at 5-6, the Special Master explains the Supreme Court language on which he relies. An examination of that language reveals that the

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[9] Article VIII-I of the Arkansas River Compact provides:

> "I. Findings of fact made by the Administration shall not be conclusive in any court or before any agency or tribunal but shall constitute prima facie evidence of the facts found."

Except for punctuation and the word "commission" in place of "Administration," Article V-(f) of the Pecos River Compact is identical.

Court did nothing more than go along with a unanimous finding of the Commission as to river flow depletions for certain years. *Texas v. New Mexico*, 462 U.S. at 575.

I find no support in the Pecos River decisions for Kansas' assertion that the Court "has accepted the proposition that the States are bound by the unanimous action of an interstate agency within the scope of the Compact it is charged to administer." Kansas Brief at 9. The Compact itself limits Administration findings to prima facie effect. Note 9, *supra*. The Compact is a law of the United States, and "unless the compact to which Congress has consented is somehow unconstitutional, no court may order relief inconsistent with its express terms." *Texas v. New Mexico*, 462 U.S. at 564. Kansas' present position thus amounts to a claim that the Supreme Court, without saying so, has ruled that the Compact provision permitting it to review findings is unconstitutional. The Court simply did not do that.

Nor do I agree with Kansas' alternative claim that, even if Administration findings are given only prima facie effect, Colorado has come forward with no evidence sufficient to overcome it. There is ample evidence on which a trier of fact could determine that rollover and winter storage at the Trinidad Project are compatible with the standards established by the Compact.

Even if we consider, for purposes of argument, that the action of the Arkansas River Compact Administration in approving the Operating Principles amounts to a finding, that assumption still does not lead to the conclusion sought by Kansas. At best, such a finding would have to be implied, namely, that operation of the Trinidad Project

according to the 1961-64 Studies and the Operating Principles would not violate Article IV-D. But that fact is not disputed. Rather, it is the failure to so operate that is at issue, and there is certainly no finding on this point. It does not follow from the Administration action, assuming that it amounts to an implied finding, that *failure* to strictly observe the Operating Principles, or to operate differently in any way, would necessarily result in a material depletion. That is the finding that would be required to undergird the Kansas position. Yet there is nothing in the Administration's approval to suggest whether or not any other operating principles would constitute a violation. Indeed, in providing expressly for periodic review, the parties clearly contemplated that there might well be acceptable changes.

Going beyond the subject of findings as such, Kansas argues more broadly in its Supplemental Opposition that the *Texas* case holds that unanimous action of the states, accomplished through the Compact Administration, is to be accorded decisive weight, and that it will not be disturbed by exercise of the Court's original jurisdiction. Dictum in the 1983 opinion in that case is cited to the effect that the Court is not disposed to consider the claims of a state having "second thoughts." 462 U.S. at 570-571. It is contended that Administration approval of the Operating Principles constituted the kind of state action which will not be reviewed by the Court.

The language cited by Kansas was only an incidental comment in a case which did not even involve second thoughts. In the face of *nonaction* by the Pecos River Commission, the Court refused to appoint a third tie-breaking member and instead exercised its own original

jurisdiction to resolve the dispute, rejecting New Mexico's contention that the Court could act only to review decisions actually made by the Commission. Indeed, the real lesson in that decision lies in the Court's strong criticism of any situation where a state may create an advantageous impasse by refusing to give its consent. 462 U.S. at 568-570.

Our case is directly analogous to what the Supreme Court held in the *Texas* case. There, Texas and New Mexico made an agreement (the Pecos River Compact), including a requirement that future findings as to river depletion could be adopted only by unanimous vote of the Commission. Here, the Administration approved the Operating Principles, with the five Kansas conditions, including a requirement that future modification based on periodic review could be authorized only by unanimous consent. As a result, we now face the type of impasse condemned in the *Texas* decision. Responding to New Mexico's claim that Texas should be denied relief, the Court said:

> "In the absence of an explicit provision or other clear indications that a bargain to that effect was made, we shall not construe a compact to preclude a State from seeking judicial relief when the compact does not provide for an equivalent method of vindicating the State's rights." 462 U.S. at 569-570.

I do not find in the Kansas conditions, or in the circumstances surrounding their adoption, any explicit provision or clear indications that Kansas should have a veto power over changes in the Operating Principles. Rather I conclude, as counsel for the United States urged on the

first day of trial, RT Vol. 1 at 32-33 (Sept. 17, 1990), that Kansas' approval of such changes may not be unreasonably withheld.

D. The Need to Show Material Depletion.

From the outset, development of the Trinidad Project was guided by two general aims, improvement of flood protection and irrigation supplies in the local Trinidad area, and protection against significant depletion of usable downstream flows. Those principles run consistently through the first 1953 Review Report, through the 1956 House Document 325, and through the 1961-64 studies. Jt. Exh. 34 at 2-4, 16-21; Jt. Exh. 24a at 20-21; Jt. Exh. 24b, Appendix A at 7, 71 *et seq.*; Jt. Exh. 42. Even in the final letter from the Kansas Governor in which he approved the amended Operating Principles, and removed any further Kansas objection to the project, he characterized Kansas' concern as follows:

> "I appreciate the consideration given by the Bureau of Reclamation and the Purgatoire River Water Conservancy District to the concern of the State of Kansas that the operation of the proposed Trinidad Project not adversely affect the volume of water flowing into John Martin Reservoir." Jt. Exh. 45.

Insofar as Kansas is concerned, the desired protection is established in Article IV-D of the Arkansas River Compact. New dams and reservoirs in Colorado are permitted, provided the flows of the Arkansas River are not materially depleted in usable quantity or availability for use in Kansas. Kansas was never intended to benefit from the Trinidad Project, but rather only to be protected

against material depletions. Jt. Exh. 23 at 20; RT Vol. 18 at 119-20 (Oct. 23, 1990). The Operating Principles were not intended as an end in and of themselves, but were designed to meet those Article IV-D requirements. RT Vol. 18 at 119 (Oct. 23, 1990). They were not calculated to provide Kansas with additional water. Project benefits were to belong to the local Trinidad area, and that area alone paid the full local share of project costs. Jt. Exh. 39. The Bureau wrote in its 1988 Report:

> "Nowhere in either the Operating Principles or the Project history is there any suggestion that downstream users are entitled to any water supply benefits from the Project." Jt. Exh. 23 at 20.

Kansas' expert witness Spronk also testified:

> "Special Master: Were the Operating Principles designed also to provide any benefit from the Trinidad Project to downstream users and particularly to the inflow into John Martin?
>
> "The Witness: From my review of the documents, I do not believe that the project was meant to benefit downstream users. However, there was a grave concern on behalf of downstream users that it not cause any detriment either. And as a result, the Operating Principles are meant to carry out, I think, that protection to downstream users." RT Vol. 18 at 119 (Oct. 23, 1990).

If, for purposes of argument, however, it is assumed as Kansas claims that the Administration's motion constituted Compact action authorized by Article VIII-B, it still does not follow that Kansas has a separate right to enforce the Operating Principles apart from showing a

material depletion. Valid action by the Compact Administration must implement the Compact. In this situation, that means Compact Article IV-D prohibiting material depletion. The States both understood in 1980 that the focus of any Compact violation had to be on material depletion. The investigation authorized by the Compact Administration in 1980, on the basis of the Kansas complaint, was to determine whether the Trinidad operation had "materially depleted" the flows of the Arkansas River. Jt. Exh. 88 at 4.15; RT Vol. 18 at 113-15 (Oct. 23, 1990).

I conclude that the operation of Trinidad Reservoir is subject to the Article IV-D prohibition against material depletion of usable flows. While the Operating Principles were expected to provide that protection, it is not enough to show that they were not fully observed, if the object is to establish a Compact violation. It is the actual operation of the Project that counts, and whether such operation has caused a material depletion.

E. Reliance Upon Average Flows.

The final issue raised by the Kansas evidence and legal arguments is whether average flows can be used to judge compliance with downstream obligations. The Kansas showing of depletions, of course, was tied to its legal theory that it needed to show only a violation of the Operating Principles. As discussed earlier, Spronk calculated depletions during the 1979-84 period based on the difference between actual inflow into John Martin Reservoir during any given month and the inflow that would have occurred, absent any violation of the Operating

Principles. He did not offset such depletions by months in which flows were greater than expected, although he acknowledged that stored water in John Martin could indeed buffer the impact of any depletion if the question were one of injury to Kansas users. RT Vol. 18 at 72 (Oct. 23, 1990). So long as water was available to Kansas from John Martin storage, he agreed that any injury could be "mitigated by the accretions that occur after depletion occurred; or visa versa if there is accretion before the depletion." *Id.* Apparently he made some analysis of the times when the conservation pool in John Martin spilled or was empty, but he offered no details and presented no showing of injury. *Id.*

As a matter of law, in an original action to enforce the Compact in this situation, Kansas must show a material depletion under Article IV-D. Its evidence on depletions was not calculated to do this, and is therefore legally deficient.

Rejection by Kansas of the use of any averages is also contrary to the way the project was viewed as it was being developed and evaluated. Certainly Kansas understood that Trinidad Reservoir, planned in part for conservation, would alter the flow regimen of the Purgatoire River. That is the nature of such a dam, to store water and release it later. The 1961-64 studies were aimed at quantifying such downstream impacts. The 1925-57 study period was judged to be indicative of future conditions. Jt. Exh. 24a at 13. Results were displayed in annual increases and decreases in flow due to the project, resulting in a net average annual increase of 400 AF. *Id.* at 22, Table 8. This average included 21 years in which the project caused an increase in flows into John Martin, and

14 years of decrease. When compared to without-project conditions, the Bureau of Reclamation concluded that the project would increase inflow in 16 of the driest years, and decrease inflow into John Martin during 8 of the 12 wettest years. Jt. Exh. 23 at 26. The largest depletions shown in the 1961-64 studies occurred when John Martin Reservoir would spill, and therefore ". . . would not reduce the usable water. . . ." *Id.* at 28.

Kansas' expert witness Spronk acknowledged that the documents which Kansas had in hand when it gave approval to the project showed average annual impacts. RT Vol. 18 at 120-21 (Oct. 23, 1990). He could point to no occasion when Kansas indicated that the 1961-64 studies were inaccurate or had improperly analyzed impacts. *Id.* at 96-98. I have found no evidence that Kansas did not evaluate the project on the basis of average impacts. The Bureau of Reclamation found that "[b]oth the State of Kansas and the Arkansas River Compact Administration based their approval of the Trinidad Project on the 1961 and 1964 Studies. . . ." Jt. Exh. 23 at 28.

Kansas properly makes the point that the use of averages may sometimes be inappropriate. Water withheld only to be delivered long after it is needed may not mitigate injury. Article IV-D of the Compact protects not only the quantity but also the "availability" of water against material depletion. However, it is clear here that Trinidad Reservoir was analyzed originally on the basis of net average impacts on inflow into John Martin, including annual averages, without objection from Kansas.

F. Administrative Claim Question.

Finally, the United States raises the question, apart from a claim based on depletions of flow, of whether a separate cause of action is available under the Compact to enforce compliance with its investigatory and administrative provisions. The United States asks for a specific ruling on whether Kansas has stated such a valid administrative cause of action, and if so, what proof is required to survive a motion to dismiss.

Colorado takes the view that the allegations in the Kansas complaint, which may suggest that Kansas seeks enforcement of the administrative provisions, have been "effectively abandoned." Colorado Response to Supplemental Statements at 8. Kansas responds that it ". . . has not abandoned its position that it is entitled under the compact to good faith compliance by Colorado with the administrative provisions of the Compact." Kansas letter of April 9, 1992.

I do not believe it is necessary to rule on the broad question of whether an administrative cause of action may ever exist under the Compact. What is potentially at stake here was effectively decided in my pre-trial decision on Colorado's Motion to Stay. Decision of Special Master, dated Oct. 21, 1988. Kansas moved for leave to file its complaint in the Supreme Court on December 16, 1985. Colorado filed a brief in opposition arguing that Kansas had not made a reasonable effort to resolve its concerns through the Compact Administration. In response, on March 3, 1986, Kansas filed a new motion in the alternative, either for leave to file its complaint in the Supreme Court, or to compel an investigation by the

Compact Administration pursuant to Article VIII-H. Without argument, the Supreme Court granted the Kansas motion to file the complaint, giving Colorado 60 days within which to file an answer.

Colorado then filed a motion before me to stay these proceedings on two of the issues in the complaint, i.e., post-Compact well development and the operation of Trinidad Reservoir. The motion was based on the alleged failure by Kansas to exhaust its administrative remedies and sought to return those two issues to the Compact Administration. Both States agreed that a "reasonable effort" to proceed first through the Compact Administration was required. However, Kansas argued vigorously that it had done so for some five years, and that it would be futile to proceed further through the Compact Administration. Kansas thus sought judicial not administrative relief. I denied the Colorado motion, concluding that Kansas had indeed made the requisite effort before the Compact Administration, ". . . but because of the inherent limitations in that procedure, the parties reached an impasse." *Id.* at 5. The Arkansas River Compact, like certain others, requires both States to agree. See *Texas v. New Mexico*, 462 U.S. 554, 568 (1983).

The administrative allegations in the Kansas complaint relate to the need to establish an exhaustion of administrative remedies. Once leave to file its complaint was granted by the Supreme Court, Kansas no longer looked for an administrative remedy.

V.

CONCLUSION

There can be little doubt, as a practical matter, that Trinidad Reservoir would not have been constructed if Kansas had continued to oppose the project. Kansas' ultimate approval represented the kind of good faith cooperation that must be forthcoming if the Compact purposes are to be fulfilled. Kansas appropriately recognized the need to improve flood protection and irrigation supplies for the local Trinidad area, so long as its own Compact entitlement was not adversely impacted. Clearly Kansas relied on the 1961-64 studies and the Operating Principles to provide that necessary downstream protection.

It is understandable, therefore, that Kansas felt wronged when Colorado, its local conservancy district, and the United States, from the first year, failed to operate the project in a way that was consistent with the earlier study conditions. While there may be some dispute about the interpretation of the Operating Principles, there is no doubt that the 1961-64 studies did not include the practice of rollover or the storage of winter water outside of the Model right.

It concerns me that the project was not initially operated according to the earlier understandings, especially since the Operating Principles anticipated review, and modification if necessary. Nonetheless, this is a case involving alleged Compact violations, and I believe that such a claim requires a showing that the Trinidad operations caused a material depletion within the meaning of Article IV-D. Kansas has not established, and did not attempt to establish, such injury. This is not to hold that

the operations of Trinidad Reservoir have not caused the requisite injury, but if so, Kansas did not show it. Nor does this decision mean that Kansas may not have a future claim based on Trinidad Reservoir. Colorado is under a continuing obligation to see that the operation of Trinidad Reservoir does not violate Article IV-D.

While not specifically raised by Colorado's motion, the issue of possible amendments to the Operating Principles remains unresolved. The Bureau of Reclamation has recommended that all interested parties work together to amend the Operating Principles to provide for optimum beneficial use in the Trinidad area "consistent with the protection of downstream non-project rights." Jt. Exh. 23 at 57. It further recommends that any proposed amendments be submitted to the State of Kansas for approval, pursuant to Kansas Condition 2, "provided the amended Operating Principles will not result in less inflow to John Martin Reservoir than would have occurred had the Trinidad Project not been built." *Id.* at 57. I concur in these recommendations. I believe that Kansas' review of any changed operating conditions must be based on whether or not such operation will cause a material depletion of usable flows under Article IV-D of the Compact. Kansas may not unreasonably withhold its approval in order to secure benefits from the Trinidad Project.

Accordingly, for the reasons given throughout this decision, and subject to confirmation by the Supreme Court, the Colorado motion to dismiss Kansas' Trinidad claim is hereby granted.

DATED: June 9, 1992

/s/ Arthur L. Littleworth
Arthur L. Littleworth
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business address is Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502.

I am readily familiar with Best, Best & Krieger's practice for collecting and processing correspondence for mailing with the United States Postal Service. Under that practice, all correspondence is deposited with the United States Postal Service the same day it is collected and processed in the ordinary course of business.

On June 9, 1992, I served the within **DECISION OF SPECIAL MASTER ON COLORADO'S MOTION TO DISMISS KANSAS' TRINIDAD RESERVOIR CLAIM** by placing a copy of the document in a separate envelope for each addressee named below and addressed to each such addressee as follows:

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On June 9, 1992, at the office of Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502, I sealed and placed each envelope for collection and deposit by Best, Best & Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on June 9, 1992, at Riverside, California.

/s/ Sandra L. Simmons
Sandra L. Simmons

No. 105, ORIGINAL

In The

Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

and

UNITED STATES OF AMERICA,

Defendant-Intervenor.

ARTHUR L. LITTLEWORTH, Special Master

REPORT – PART IV

ORDER GRANTING KANSAS' MOTION TO DISMISS COLORADO'S LAKE MCKINNEY COUNTERCLAIM

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant, UNITED STATES OF AMERICA, Defendant-Intervenor.	)	No. 105 Original October Term, 1985

ORDER GRANTING KANSAS' MOTION TO DISMISS COLORADO'S LAKE MCKINNEY COUNTERCLAIM

(Filed Apr. 20, 1992)

The State of Kansas on September 5, 1991 filed a Motion to Dismiss Colorado Counterclaim which embraced two separate issues. The first issue was designated in the motion as the "Lake McKinney Counterclaim," and relates to Paragraph 5 of Colorado's Answer to the First Amended Complaint and Counterclaim filed December 13, 1989. The second part of the Kansas motion dealt with Paragraphs 6 and 7 of the Colorado Counterclaim, and was described as the "Well Counterclaim." The Kansas motion was thoroughly briefed by both States, and, without objection, I have ruled that oral argument on the Lake McKinney issue is not necessary.

The motion was filed under the guidance provided by Rule 41(b) of the Federal Rules of Civil Procedure. While the Federal Rules of Civil Procedure do not technically control actions within the Supreme Court's original

jurisdiction, the Rules may be taken as a guide in original actions. Supreme Court Rule 17.2.[1] The Kansas motion is based on the grounds that the evidence on the Colorado counterclaim has been completed, and that Colorado has shown no right to relief on the facts and the law. The provisions of Rule 41(b) apply to the dismissal of counterclaims. Rule 41(c); see *Sea-Land Service, Inc. v. Banca de Republica de Dominica*, 697 F.Supp. 253, 257 (E.D. La. 1988). It is not clear, however, that all of the evidence which may bear upon the Well Counterclaim has indeed been submitted, and the ruling on that portion of the motion is reserved at this time. With respect to the Lake McKinney Counterclaim, Colorado did indicate that its presentation of evidence was complete. RT Vol. LXXXVII at 157-160 (May 30, 1991).

Article V-E(2) of the Arkansas River Compact provides: "Water released [from John Martin Reservoir] upon concurrent or separate demands shall be applied promptly to beneficial use unless storage thereof downstream is authorized by the [Arkansas River Compact] Administration." Colorado has alleged in its counterclaim that State officials in Kansas violated this provision of the Compact by allowing water released from John Martin

[1] Effective December 1, 1991, the vehicle for the result sought by the Kansas motion would be Rule 52(c) rather than Rule 41(b). However, all evidence on the Lake McKinney matter had been presented and all briefing had been completed before December 1, 1991. Especially since the Federal Rules of Civil Procedure are only a guide for Supreme Court action, it is appropriate to continue to treat Kansas' motion as one governed by former Rule 41(b).

Reservoir upon demand by Kansas to be stored downstream in Lake McKinney in Kansas, rather than being applied promptly to beneficial use.

Under the Compact, water stored in the conservation pool of John Martin Reservoir constitutes a common resource to be released ". . . upon demands by Colorado and Kansas concurrently or separately at any time during the summer storage period." Article V-C. The prohibition against storage of such releases prevents either State from demanding more water than currently needed and thereby reducing the amount of water available to the other State. However, since 1980, the common pool concept has in effect been abrogated. Under the 1980 Resolution adopted by the Compact Administration, which currently controls reservoir releases, water stored in the conservation pool of John Martin is allocated into separate storage accounts for each State or its users. Demands for releases are charged against such separate, individual accounts. Jt. Exh. 21, Document 29. Under these circumstances, the prohibition against downstream storage of John Martin water appears to be of less significance. Nonetheless, the provisions of Article V-E(2) remain in the Compact and still constitute an obligation binding on each State.

The undisputed evidence shows that Lake McKinney is a small reservoir located north of the Arkansas River in Kansas that is fed by the Amazon Canal. The reservoir is only about twelve feet deep, and has a current capacity of approximately 3600 acre-feet (AF), although it was larger in the earlier years. Since 1952, the only way for certain Great Eastern Ditch Association lands to receive water

from the Arkansas River has been through Lake McKinney. The outlet capacity from Lake McKinney is less than the inlet capacity, resulting in some inevitable short-term retention of water. RT Vol. XXXII at 134-36 (Nov. 28, 1990).

The Kansas witnesses testified that water released from storage in John Martin Reservoir had not been stored in Lake McKinney in violation of the Compact. RT Vol. XXVII at 102-133 (Nov. 13, 1990); RT Vol. XXXII at 123-155 (Nov. 28, 1990); RT Vol. XXXIII at 4-10, 39, 52-60, 99-100 (Nov. 29, 1990); see also Colo. Exh. 21 at 76; Colo. Exh. 33 at 153-58.

The depositions of the Kansas State Water Commissioner for the Lake McKinney area and of another Kansas Division of Water Resources employee were also admitted into evidence. Both men were involved in the local administration of water rights, one with 40 years of experience, and the other with 27. Their instructions were to release water from Lake McKinney ". . . when John Martin water was being diverted into the Great Eastern;" and when John Martin water was going into Lake McKinney, "reservoir water had to be coming out." Colo. Exh. 21 at 76; Colo. Exh. 33 at 153. It was "common knowledge" that John Martin water was not to be held in storage in Lake McKinney. Colo. Exh. 21 at 76. They checked on it often and knew of no such storage. Colo. Exh. 21 at 76-77; Colo. Exh. 33 at 153, 156-57.

Three Colorado witnesses testified on the subject. The first was George Moravec, who flew over the lake on July 29, 1980. He testified that water was then flowing into the lake from the Amazon Canal, but there was only

a small pool of water in the outlet ditch. RT Vol. LX at 71-73, 76 (April 11, 1991). Photographs taken by Mr. Moravec were also introduced into evidence. Colo. Exh. 489-4. The Compact Administration records show that water from John Martin Reservoir was being released to Kansas from June 9, 1980 through August 9, 1980. Jt. Exh. 18, No. 32, Compact Admin. Report for 1979-80, Appendix B-11, p. 33. The transit time for water to travel from John Martin Reservoir to Lake McKinney is approximately four or five days. RT Vol. XXXII at 133, 137 (Nov. 28, 1990); Vol. LXXXVII at 8-15, 21-24 (May 30, 1991); Kan. Exh. 635. The most favorable view of this evidence for Colorado, therefore, is that water from storage in John Martin Reservoir was in Lake McKinney on the single day when Mr. Moravec saw it, namely, July 29, 1980. However, there was no evidence on how long such water remained there, or that the water was not being "promptly applied to beneficial use," as required by the Compact. Lake McKinney does not have the capacity to store all of the water released from John Martin over that two-month period. Most of such releases either had to be diverted and used by other Kansas canal companies, or pass through the lake.[2]

---

[2] Large amounts of water were stored and released from John Martin Reservoir during the June-August period. Demands by Kansas from its storage account in John Martin were 31,067 AF in June, 49,600 AF in July, and 13,411 AF in August. Jt. Exh. 18, No. 32, Compact Admin. Report for 1979-80, Appendix B-11, p. 33. Stateline flows during these months were 25,930 AF, 43,370 AF and 22,750 AF, respectively. *Id.*, Appendix B-8, p. 30.

The second Colorado witness was Thomas A. Williamsen who testified as an expert to a study he had made with respect to releases from John Martin, based upon a review of the Great Eastern records and the records of the Arkansas River Compact Administration. He concluded that ". . . water was being stored in Lake McKinney on July 29, 1980, when the Moravec photos were taken." RT Vol. LXIX at 28-29 (April 25, 1991). He testified further that water was being released from John Martin Reservoir at the same time. *Id.* at 29. But Mr. Williamsen did not testify that it was John Martin water that was being stored in Lake McKinney, and he was not asked that question. Releases from John Martin Reservoir are not the only source of water for the Arkansas River in Kansas, and are not the only source of water for Lake McKinney. There are daily contributions of precipitation, tributary inflows, natural base flow of the river, and irrigation return flows.

Mr. Williamsen said that he also found similar instances in 1967, 1968 and 1980 when water was stored in Lake McKinney at the same time that releases were being made from John Martin Reservoir. But, again, he did not testify that the water stored in Lake McKinney came from storage in John Martin Reservoir. Even so, and with the exception of one instance in 1967 when he testified that water was held over from the end of one irrigation season to the next, he concluded generally that there was ". . . a short period of time between storage and release." RT Vol. LXIX at 30 (April 25, 1991). He said that the water ". . . was released shortly after the storage began." *Id.* at 30. Moreover, there was no evidence that these instances were "allowed" by Kansas officials, or

that Colorado lodged any objection at the time, with either Kansas or the Arkansas River Compact Administration. In prior proceedings in this case, both States acknowledged a responsibility to bring any alleged Compact violations first to the attention of the Compact Administration.

Colorado's final witness on this subject was Dr. Jeris A. Danielson, the Colorado State Engineer. He described a 1980 inspection trip which he had made in Kansas, during which he saw water in Lake McKinney. But on cross-examination he acknowledged that he did not know whether or not it was John Martin water. RT Vol. LXXXVII at 15 (May 30, 1991). In fact, it appears from the Compact Administration records that Dr. Danielson visited Lake McKinney some two or three days before the releases from John Martin could have reached the lake. RT Vol. XXXII at 133, 137 (Nov. 28, 1990); Vol. LXXXVII at 8-15, 21-24 (May 30, 1991); Kan. Exh. 635. Kansas moved to strike Dr. Danielson's testimony in regard to his Lake McKinney observations on the ground that such testimony was irrelevant. I do not find that his testimony helped to establish the Colorado counterclaim, but neither do I believe that it was irrelevant. The Kansas Motion to Strike is denied.

Reviewing all of the evidence and the briefs of counsel, I find that Colorado has not established a Compact violation on the part of Kansas officials for allowing the storage of John Martin water in Lake McKinney instead of applying it "promptly to beneficial use."

Kansas has advanced one additional argument in support of its motion. The argument is not necessary to

this decision, but my observations may be helpful for the future. Kansas maintains that any water released from the separate Kansas storage account under the 1980 Resolution was not water released from conservation storage, and hence could not cause a violation of Article V-E(2), even if it were stored in Kansas. This argument presupposes that Article V-E(2) of the Compact is limited to the definition of "conservation storage" which is found in the 1980 Resolution. I do not agree with that interpretation. The Compact simply refers to "releases of stored water," as well as to releases of river flow. Article V-E(1). The Compact then requires that such releases must be "applied promptly to beneficial use," unless downstream storage has been authorized by the Compact Administration. Article V-E(2). It seems to me that water which has been released from conservation storage into the separate Kansas storage account under the 1980 Resolution, yet physically remains in John Martin Reservoir, is still water that is "stored" within the meaning of Article V-E.

The States also spent considerable effort in their briefs arguing the standard of proof required for a motion of this kind. That issue may be important later when significant conflicts in the evidence must be resolved. However, it is not a matter that needs to be settled in order to decide the Lake McKinney portion of this Kansas motion.

Subject to confirmation by the Supreme Court, the Kansas Motion to Dismiss Colorado's Lake McKinney Counterclaim is granted.

DATE: April 20, 1992

s/ Arthur L. Littleworth
Arthur L. Littleworth,
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business address is Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502.

I am readily familiar with Best, Best & Krieger's practice for collecting and processing correspondence for mailing with the United States Postal Service. Under that practice, all correspondence is deposited with the United States Postal Service the same day it is collected and processed in the ordinary course of business.

On April 20, 1992, I served the within **ORDER GRANTING KANSAS' MOTION TO DISMISS COLORADO'S LAKE MCKINNEY COUNTERCLAIM** by placing a copy of the document in a separate envelope for each addressee named below and addressed to each such addressee as follows:

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On April 20, 1992, at the office of Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502, I sealed and placed each envelope for collection and deposit by Best, Best & Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on April 20, 1992, at Riverside, California.

s/ Sandra L. Simmons
Sandra L. Simmons

No. 105, ORIGINAL

In The

Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

and

UNITED STATES OF AMERICA,

Defendant-Intervenor.

ARTHUR L. LITTLEWORTH, Special Master

REPORT - PART V

ORDER GRANTING KANSAS' MOTION TO DISMISS COLORADO'S WELL COUNTERCLAIM

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant, UNITED STATES OF AMERICA, Defendant-Intervenor.	)	No. 105 Original October Term, 1985

ORDER GRANTING KANSAS' MOTION TO DISMISS COLORADO'S WELL COUNTERCLAIM

(Filed Jul. 31, 1992)

On September 5, 1991 Kansas filed a Motion to Dismiss Colorado Counterclaim which addressed two paragraphs of Colorado's "Answer to the First Amended Complaint and Counterclaim" filed December 13, 1989. Part of the motion related to Paragraph 5 of the Colorado counterclaim and was designated as the "Lake McKinney Counterclaim." That portion of the motion was decided by order dated April 20, 1992.

The remainder of the Kansas motion sought to dismiss Paragraph 6 of the Colorado counterclaim, described in the motion as the "Well Counterclaim." In the April 20, 1992 order, I reserved the ruling on this issue because it was not then clear that all of the evidence on the matter had been presented. However, both Kansas and Colorado, as well as the United States, have now rested their

respective cases in chief, and the motion is ripe for decision.

The Kansas motion was filed under Rule 41(b) of the Rules of Civil Procedure, which allows a court to dismiss a claim at the close of a party's evidence on the ground that, upon the facts and the law, the party has failed to establish a right to relief. The substance of Rule 41(b) is now found in Rule 52(c). Under this rule and its predecessor, a court may weigh and consider the evidence, and resolve conflicts. *Stearns v. Beckman Instruments, Inc.*, 737 F.2d 1565, 1567-1568 (Fed. Cir. 1984); *Ellis v. Carter*, 328 F.2d 573, 577 (9th Cir. 1964); see also *Lemelson v. United States*, 752 F.2d 1538, 1547 (Fed. Cir. 1985, Claims Court Rule 41(b)).

The portion of the Colorado counterclaim which is the subject of this motion reads as follows:

> "6. Subsequent to the approval of the Arkansas River Compact by the United States Congress in 1949, state officials charged with the administration of water rights in Kansas have allowed the construction of wells and have permitted ground water appropriations in Kansas that have materially depleted the usable quantity or availability for use to the surface water users in Kansas under the Compact. Those depletions caused Kansas to make additional demands for releases of water stored in John Martin Reservoir pursuant to the Compact to the detriment of water users in Colorado."

Colorado has introduced a large amount of evidence on post-Compact well development in Kansas, on increases in irrigated acreage in Kansas, and on the

alleged impact of these activities on surface flows of the Arkansas River in Kansas. In the opinion of Duane D. Helton, one of Colorado's chief expert witnesses, such pumping has lowered groundwater levels in Kansas, causing increased seepage from the river, and thus reducing surface flows in Kansas. Colorado characterizes such percolation as "transit losses." RT Vol. 86 at 61-62 (May 29, 1991).

Most of this Colorado evidence, however, is not relevant to the Well Counterclaim. Rather, it is directed toward other basic issues in the case, such as Kansas' entitlement under the Compact, the appropriate methodology for determining "usable" stateline flows within the meaning of the Compact, and the question of whether any such transit losses are ". . . relevant as an offset to, or mitigation of, any Kansas claim of material depletion caused by post-Compact developments in Colorado after 1980." Colorado's Brief at 22. None of these issues is being decided in this order. The order involves only the independent Colorado cause of action, stated as a counterclaim, that increased river seepage, or transit losses, in Kansas have caused injury to upstream water users in Colorado, in violation of the Compact.

To consider the Well Counterclaim, some general understanding is required of the conditions under which Arkansas River water is stored in and released from John Martin Reservoir. Completed just before the Compact was negotiated, this large Federal reservoir is located on the mainstream of the Arkansas about sixty miles upstream from the Colorado-Kansas state line.

Under the 1949 Arkansas River Compact, a "conservation pool" is established in the reservoir, to be operated ". . . for the benefit of water users in Colorado and Kansas, both upstream and downstream from John Martin Dam. . . ." Article IV-C3. During the winter months, from November 1 through March 31, all water entering the reservoir is stored in the conservation pool, except that Colorado has the right to releases of 100 cfs. Article V-A.

During the summer, defined as April 1 to October 31, no flows may be stored in John Martin Reservoir when Colorado water users are operating under judicially decreed priorities. Article V-B. Under these conditions, Kansas is not entitled to any portion of the river flow entering John Martin Reservoir, but is apportioned the river flow that crosses the state line. Article V-G. Downstream from John Martin, the return flow from Colorado users in the area and occasional tributary inflow contribute to the flow of the river reaching the state line. When Colorado water users are not operating under decreed priorities, all summer flows entering the reservoir are stored, provided that Colorado may demand releases of water equivalent to the river flow up to 500 cfs, and Kansas may demand releases of water equivalent to that portion of the river flow between 500 cfs and 750 cfs. Article V-B.

Under the Compact, neither State is allocated a specific share of the water stored in the conservation pool. Rather, such stored water constitutes a common resource to be released ". . . upon demands by Colorado and Kansas concurrently or separately at any time during the summer storage period." Article V-C. Specific release

rates are provided for each State, depending upon the amount of water in storage. *Id*. The only limit, however, on the total amount of stored water that either State may take is the requirement that such water must be applied promptly to beneficial use, unless storage thereof downstream is authorized by the Administration. Article V-E(2). Obviously, it is not a system that encourages restraint in water use, or calling for water only at times when it would be most useful to the crops. Water demanded by the first State to call automatically reduces the supply available to the other. According to Colorado, the result was that "both States generally demanded simultaneous releases at the maximum rates to insure that they received their share of water stored in the reservoir." Colorado's Statement of Each State's Entitlements Under the Arkansas River Compact at 55-56.

The Compact also provides that the storage, releases from storage, and releases of river flow shall be accomplished pursuant to procedures prescribed by the Compact Administration. Article V-E(6). Presumably, this authority is the basis for certain changes effected by a resolution adopted on April 24, 1980.

Entitled "Resolution Concerning an Operating Plan for John Martin Reservoir," Jt. Exh. 21, Document 29, this resolution substantially modifies the method of operating John Martin Reservoir. The common pool concept is abandoned in favor of allocating specific State shares in the stored water. The preamble to the resolution recognizes that ". . . because of changes in the regime of the Arkansas River, the present operation of the conservation features of John Martin Reservoir does not result in the most efficient utilization possible of the water under its

control." *Id.* The Compact Administration then goes on to find that the Operating Plan which establishes individual storage accounts does result in a more efficient utilization of water, and that the provisions of the new Operating Plan are permitted by and are in compliance with the Compact.[1]

Under the 1980 Operating Plan, 40% of the stored water goes into a separate "Kansas account," while 60% is divided in varying shares among the nine Colorado canal companies located within Colorado Water District 67. Section II-D(2)(3). As to releases of water from these accounts, the Operating Plan provides:

> "Kansas and the various Colorado ditches may demand the release of water contained in their respective accounts . . . at any time and at whatever rates they desire." Section II-E(1).

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[1] In its Pre-trial Statement, at pages 165-166, Kansas took the position that:

> ". . . while Kansas believes that the 1980 Resolution results in a more efficient operation of John Martin Reservoir . . . the resolution is an administrative rewriting of Article V of the Arkansas River Compact and thus is *ultra vires* and legally void *ab initio*."

It may be that this is the Kansas position only if the 1980 Resolution is considered as an accord and satisfaction of all Kansas claims against Colorado. See Colorado's Brief at 19. In any event, the 1980 Plan has remained in operation continuously since its adoption. Kansas has not exercised its right to terminate it by giving notice on or before February 1 of any Compact year. See 1980 Resolution, Section VII-A. Moreover, during the trial, witnesses for both States supported the continuation of the Plan.

The 1980 Operating Plan also allows three Colorado canal companies, namely, Amity Mutual Irrigation Company, Fort Lyon Canal, and Las Animas Consolidated Canal Company, to store certain "other water" in John Martin Reservoir. Section HI-A, B, C. The permitted storage consists of water which Amity could otherwise divert from the Arkansas River and store in the Great Plains Reservoir system, and water which the other two canal companies could store under an approved Pueblo winter storage Plan. Section III-A, B, C.

In exchange for this storage right, the three Colorado canal companies agreed to a 35 percent water charge on all their deliveries into John Martin Reservoir. Section III-D. This 35 percent goes into a Kansas Transit Loss Account. Colorado explains the purpose of this account as follows:

> "The purpose of the Kansas Transit Loss Account was to ensure that releases from the Kansas Account upon demand by Kansas were satisfied by 'an equivalent in Stateline flow.' *See* Arkansas River Compact, Art. V-E(3). During the 1970's, the Compact Administration did not always release sufficient water from John Martin Reservoir to satisfy the releases to which Kansas was entitled by an equivalent in Stateline flow. *See* Transcript, Vol. LXXXIV (May 24, 1991) at 105 (testimony of D. Helton). The Kansas Transit Loss Account was created to address the problem." Colorado's Brief at 16.

Releases of stored water from the Kansas Account are measured at the state line, and transit losses between John Martin and the state line are made up from this Kansas Transit Loss Account. Section II-E(4).

If such losses exceed the amount in the account, the deficit is made up out of future contributions from the 35 percent storage charge. If, however, during any compact year, the transit losses are less than the amount in the Kansas Transit Loss Account, then the excess is transferred 11/35ths into the Kansas Storage Account, and 24/35ths into the storage accounts of the Colorado Water District 67 ditches. Section III-D; Colorado's Brief at 17.

Colorado's evidence in support of its Well Counterclaim is based solely upon operation of the 1980 Resolution and Operating Plan. In terms of timing, the evidence was limited to the period from 1980 to 1990. RT Vol. 115 at 30 (May 22, 1992). Colorado's sole expert witness on the issue was Duane D. Helton.

It is the Colorado position, supported by the testimony of Mr. Helton and certain exhibits, that the development of post-Compact wells in Kansas has reduced the usable flow of the Arkansas River in Kansas by causing increased seepage or transit losses; that this increase in transit losses has resulted in increased demands by Kansas against its storage account in John Martin; and that increased storage releases to Kansas have required additional releases from the Kansas Transit Loss Account, thus reducing the amount of surplus in the Transit Loss Account, 24/35ths of which would otherwise be distributed to Colorado users. RT Vol. 86 at 135-38 (May 29, 1991); RT Vol. 115 at 30-31 (May 22, 1992); Colorado Brief at 13-15, 17. In analyzing these arguments, it is important to remember that the Transit Loss Account is a creation of the 1980 Operating Plan. There is no such account in the Compact itself.

Colorado did not initially quantify its alleged loss, and the Kansas motion was based partially on that omission. In a later segment of the trial, however, over Kansas' objection, Colorado attempted to meet this argument through further testimony from Mr. Helton. He testified to additional seepage losses in Kansas from 1980 to 1990, over and above average losses from 1950-69. RT Vol. 115 at 34-36 (May 22, 1992). That added testimony is still insufficient to prove the amount of Colorado's claim, but there is a far more basic flaw in the Colorado position. The Colorado claim rests upon the allegation, as stated in the counterclaim, that Kansas made "additional demands" for releases of water stored in John Martin, thereby depleting the Transit Loss Account and the surplus otherwise available to Colorado. Colorado Counterclaim, Para. 6. However, there were no such additional or increased Kansas demands for stored water.

After 1980, Kansas had its own storage account in John Martin Reservoir. It had a right to call for all of the water stored in its account, and it did so. The 1980 Operating Plan did not place any limits on the amounts or frequency of the Kansas calls. The record is replete with evidence that users in both Colorado and Kansas generally take all the river water that is usable and legally available during the irrigation season. There is no support in the record for the notion that Kansas users would not have taken all the water available in the Kansas Storage Account even if transit losses in Kansas had been less.

Theoretically, in the years before the 1980 Operating Plan, the amount of usable surface flow in Kansas might have influenced its draws upon the conservation pool in

John Martin, which then was a common resource for the two States. However, Mr. Helton testified that during the 1970s any increased percolation in Kansas would not have affected its use of conservation storage, and that Kansas would have called for the release of all such water without regard to transit losses. RT Vol. 115 at 33-34 (May 22, 1992). And before the 1970s, Mr. Helton testified there was not really any large impact from wells in Kansas. RT Vol. 115 at 33 (May 22, 1992). Several times Mr. Helton indicated that "without" the 1980 storage account plan, Kansas' draft against conservation storage would have increased in the later years. RT Vol. 86 at 138 (May 29, 1991); RT Vol. 115 at 30, 31 (May 22, 1992). But, of course, that testimony does not establish the counterclaim. The evidence supporting Colorado's Well Counterclaim depends upon the existence of the 1980 Operating Plan, and the sharing of the surplus in the Kansas Transit Loss Account which was thereby created.

The 1980 Operating Plan requires both States to do their utmost to achieve maximum beneficial use of the stored water, including ". . . calling for deliveries of Kansas account water during reasonable and favorable river conditions." (Section II-E(5). There is no Colorado evidence that Kansas failed to meet its obligations. Moreover, when transit losses are ". . . deemed by the Colorado Division Engineer to be excessive," he is required to so advise the receiving entity. Section II-E(5). Again, Colorado presented no testimony on this point.

During the most recent segment of the trial, Mr. Helton was questioned concerning the impact of post-Compact well development in Kansas ". . . on its demand for releases from John Martin Reservoir." RT Vol. 115 at

27 (May 22, 1992). In response, Mr. Helton presented estimates of increased river seepage in Kansas for each year from 1980 through 1990, compared to the 1950-69 average. RT Vol. 115 at 34-36 (May 22, 1992). However, there was no tie-in to any "increased" demands on Kansas' storage account, nor quantification of any impact upon the Transit Loss Account or upon any surplus lost to Colorado. Indeed, there was no evidence that any surplus existed at all.

I find, therefore, that Colorado has not shown additional demands by Kansas for releases against its storage account, resulting in loss to Colorado users of surplus water in the Transit Loss Account.

Finally, there is considerable argument in the briefs concerning the nature of the 1980 Resolution, and whether it is being or can be used as an affirmative defense or to establish an accord and satisfaction or estoppel. None of that argument, however, is relevant to the limited question whether Colorado has proved its Well Counterclaim. That claim is based upon actual operations under the approved 1980 Operating Plan. If that Plan has broader implications in this case, no such issues are necessary to a decision on the Kansas motion, and they are not decided herein.

Subject to confirmation by the Supreme Court, the Kansas Motion to Dismiss Colorado's Well Counterclaim is hereby granted.

DATED: July 31, 1992

/s/ Arthur L. Littleworth
Arthur L. Littleworth,
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business address is Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502.

I am readily familiar with Best, Best & Krieger's practice for collecting and processing correspondence for mailing with the United States Postal Service. Under that practice, all correspondence is deposited with the United States Postal Service the same day it is collected and processed in the ordinary course of business.

On July 31, 1992, I served the within **ORDER GRANTING KANSAS' MOTION TO DISMISS COLORADO'S WELL COUNTERCLAIM** by placing a copy of the document in a separate envelope for each addressee named below and addressed to each such addressee as follows:

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On July 31, 1992, at the office of Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502, I sealed and placed each envelope for collection and deposit by Best, Best & Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on July 31, 1992, at Riverside, California.

/s/ Sandra L. Simmons
Sandra L. Simmons

No. 105, ORIGINAL

In The

Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

and

UNITED STATES OF AMERICA,

Defendant-Intervenor.

ARTHUR L. LITTLEWORTH, Special Master

REPORT – APPENDIX (EXHIBITS 1 - 13)

July 1994

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APPENDIX – Exhibit 1

Arkansas River Compact, 1948

ARKANSAS RIVER COMPACT, 1948

The State of Colorado and the State of Kansas, parties signatory to this Compact (hereinafter referred to as "Colorado" and "Kansas", respectively, or individually as a "State", or collectively as the "States") having resolved to conclude a compact with respect to the waters of the Arkansas River, and being moved by considerations of interstate comity, having appointed commissioners as follows: "Henry C. Vidal, Gail L. Ireland, and Harry B. Mendenhall, for Colorado; and George S. Knapp, Edward F. Arn, William E. Leavitt, and Roland H. Tate, for Kansas"; and the consent of the Congress of the United States to negotiate and enter into an interstate compact not later than January 1, 1950, having been granted by Public Law 34, 79th Congress, 1st Session, and pursuant thereto the President having designated Hans Kramer as the representative of the United States, the said commissioners for Colorado and Kansas, after negotiations participated in by the representatives of the United States, have agreed as follows:

ARTICLE I

The major purposes of this Compact are to:

A. Settle existing disputes and remove causes of future controversy between the States of Colorado and Kansas, and between citizens of one and citizens of the other State, concerning the waters of the Arkansas River and their control, conservation and utilization for irrigation and other beneficial purposes.

B. Equitably divide and apportion between the States of Colorado and Kansas the waters of the Arkansas River and their utilization as well as the benefits arising from the construction, operation and maintenance by the United States of John Martin Reservoir Project for water conservation purposes.

ARTICLE II

The provisions of this Compact are based on (1) the physical and other conditions peculiar to the Arkansas River and its natural drainage basin, and the nature and location of irrigation and other developments and facilities in connection therewith; (2) the opinion of the United States Supreme Court entered December 6, 1943, in the case of *Colorado v. Kansas* (320 U.S. 383) concerning the relative rights of the respective States in and to the use of waters of the Arkansas River; and (3) the experience derived under various interim executive agreements between the two States apportioning the waters released from the John Martin Reservoir as operated by the Corps of Engineers.

ARTICLE III

As used in this Compact:

A. The word "Stateline" means the geographical boundary line between Colorado and Kansas.

B. The term "waters of the Arkansas River" means the waters originating in the natural drainage basin of the Arkansas River, including its tributaries, upstream from

the Stateline, and excluding waters brought into the Arkansas River Basin from other river basins.

C. The term "Stateline flow" means the flow of waters of the Arkansas River as determined by gaging stations located at or near the Stateline. The flow as determined by such stations, whether located in Colorado or Kansas, shall be deemed to be the actual Stateline flow.

D. "John Martin Reservoir Project" is the official name of the facility formerly known as Caddoa Reservoir Project, authorized by the Flood Control Act of 1936, as amended, for construction, operation and maintenance by the War Department, Corps of Engineers, later designated as the Corps of Engineers, Department of the Army, and herein referred to as the "Corps of Engineers". "John Martin Reservoir" is the water storage space created by "John Martin Dam".

E. The "flood control storage" is that portion of the total storage space in John Martin Reservoir allocated to flood control purposes.

F. The "conservation pool" is that portion of the total storage space in John Martin Reservoir lying below the flood control storage.

G. The "ditches of Colorado Water District 67" are those ditches and canals which divert water from the Arkansas River or its tributaries downstream from John Martin Dam for irrigation use in Colorado.

H. The term "river flow" means the sum of the flows of the Arkansas and the Purgatoire Rivers into John Martin Reservoir as determined by gaging stations appropriately located above said Reservoir.

I. The term "the Administration" means the Arkansas River Compact Administration established under Article VIII.

ARTICLE IV

Both States recognize that:

A. This Compact deals only with the waters of the Arkansas River as defined in Article III.

B. This Compact is not concerned with the rights, if any, of the State of New Mexico or its citizens in and to the use in New Mexico of waters of Trinchera Creek or other tributaries of the Purgatoire River, a tributary of the Arkansas River.

C. (1) John Martin Dam will be operated by the Corps of Engineers to store and release the waters of the Arkansas River in and from John Martin Reservoir for its authorized purposes.

(2) The bottom of the flood control storage is presently fixed by the Chief of Engineers, U.S. Army, at elevation 3,851 feet above mean sea level. The flood control storage will be operated for flood control purposes and to those ends will impound or regulate the streamflow volumes that are in excess of the then available storage capacity of the conservation pool. Releases from the flood control storage may be made at times and rates determined by the Corps of Engineers to be necessary or advisable without regard to ditch diversion capacities or requirements in either or both States.

(3) The conservation pool will be operated for the benefit of water users in Colorado and Kansas, both

upsteam and downstream from John Martin Dam, as provided in this Compact. The maintenance of John Martin Dam and appurtenant works may at times require the Corps of Engineers to release waters then impounded in the conservation pool or to prohibit the storage of water therein until such maintenance work is completed. Flood control operation may also involve temporary utilization of conservation storage.

D. This Compact is not intended to impede or prevent future beneficial development of the Arkansas River basin in Colorado and Kansas by Federal or State agencies, by private enterprise, or by combinations thereof, which may involve construction of dams, reservoir, and other works for the purposes of water utilization and control, as well as the improved or prolonged functioning of existing works: Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction.

ARTICLE V

Colorado and Kansas hereby agree upon the following basis of apportionment of the waters of the Arkansas River:

A. Winter storage in John Martin Reservoir shall commence on November 1st of each year and continue to and include the next succeeding March 31st. During said period all water entering said reservoir up to the limit of the then available conservation capacity shall be stored: Provided, that Colorado may demand releases of water

equivalent to the river flow, but such releases shall not exceed 100 c.f.s. (cubic feet per second) and water so released shall be used without avoidable waste.

B. Summer storage in John Martin Reservoir shall commence on April 1st of each year and continue to and include the next succeeding October 31st. During said period, except when Colorado water users are operating under decreed priorities as provided in paragraphs F and G of this Article, all water entering said reservoir up to the limit of the then available conservation capacity shall be stored: Provided, that Colorado may demand releases of water equivalent to the river flow up to 500 c.f.s., and Kansas may demand releases of water equivalent to that portion of the river flow between 500 c.f.s. and 750 c.f.s., irrespective of releases demanded by Colorado.

C. Releases of water stored pursuant to the provisions of paragraphs A and B of this Article shall be made upon demands by Colorado and Kansas concurrently or separately at any time during the summer storage period. Unless increases to meet extraordinary conditions are authorized by the Administration, separate releases of stored water to Colorado shall not exceed 750 c.f.s., separate releases of stored water to Kansas shall not exceed 500 c.f.s., and concurrent releases of stored water shall not exceed a total of 1,250 c.f.s.: Provided, that when water stored in the conservation pool is reduced to a quantity less than 20,000 acre-feet, separate releases of stored water to Colorado shall not exceed 600 c.f.s., separate releases of stored water to Kansas shall not exceed 400 c.f.s., and concurrent releases of stored water shall not exceed 1,000 c.f.s.

D. Releases authorized by paragraphs A, B and C of this Article, except when all Colorado water users are operating under decreed priorities as provided in paragraphs F and G of this Article, shall not impose any call on Colorado water users that divert waters of the Arkansas River upstream from John Martin Dam.

E. (1) Releases of stored water and releases of river flow may be made simultaneously upon the demands of either or both States.

(2) Water released upon concurrent or separate demands shall be applied promptly to beneficial use unless storage thereof downstream is authorized by the Administration.

(3) Releases of river flow and of stored water to Colorado shall be measured by gaging stations located at or near John Martin Dam and the releases to which Kansas is entitled shall be satisfied by an equivalent in Stateline flow.

(4) When water is released from John Martin Reservoir appropriate allowances as determined by the Administration shall be made for the intervals of time required for such water to arrive at the points of diversion in Colorado and at the Stateline.

(5) There shall be no allowance or accumulation of credits or debits for or against either State.

(6) Storage, releases from storage and releases of river flow authorized in this Article shall be accomplished pursuant to procedures prescribed by the Administration under the provisions of Article VIII.

F. In the event the Administration finds that within a period of fourteen (14) days the water in the conservation pool will be or is liable to be exhausted, the Administration shall forthwith notify the State Engineer of Colorado, or his duly authorized representative, that commencing upon a day certain within said fourteen (14) day period, unless a change of conditions justifies cancellation or modification of such notice, Colorado shall administer the decreed rights of water users in Colorado Water District 67 as against each other and as against all rights now or hereafter decreed to water users diverting upstream from John Martin Dam on the basis of relative priorities in the same manner in which their respective priority rights were administered by Colorado before John Martin Reservoir began to operate and as though John Martin Dam had not been constructed. Such priority administration by Colorado shall be continued until the Administration finds that water is again available in the conservation pool for release as provided in this Compact, and timely notice of such finding shall be given by the Administration to the State Engineer of Colorado or his duly authorized representative: Provided, that except as controlled by the operation of the preceding provisions of this paragraph and other applicable provisions of this Compact, when there is water in the conservation pool the water users upstream from John Martin Reservoir shall not be affected by the decrees to the ditches in Colorado Water District 67. Except when administration in Colorado is on a priority basis the water diversions in Colorado Water District 67 shall be administered by Colorado in accordance with distribution agreements made

from time to time between the water users in such District and filed with the Administration and with the State Engineer of Colorado or, in the absence of such agreement, upon the basis of the respective priority decrees, as against each other, in said District.

G. During periods when Colorado reverts to administration of decreed priorities, Kansas shall not be entitled to any portion of the river flow entering John Martin Reservoir. Waters of the Arkansas River originating in Colorado which may flow across the Stateline during such periods are hereby apportioned to Kansas.

H. If the usable quantity and availability for use of the waters of the Arkansas River to water users in Colorado Water District 67 and Kansas will be thereby materially depleted or adversely affected, (1) priority rights now decreed to the ditches of Colorado Water District 67 shall not hereafter be transferred to other water districts in Colorado or to points of diversion or places of use upstream from John Martin Dam; and (2) the ditch diversion rights from the Arkansas River in Colorado Water District 67, and of Kansas ditches between the Stateline and Garden City shall not hereafter be increased beyond the total present rights of said ditches, without the Administration, in either case (1) or (2), making findings of fact that no such depletion or adverse effect will result from such proposed transfer or increase. Notice of legal proceedings for any such proposed transfer or increase shall be given to the Administration in the manner and within the time provided by the laws of Colorado or Kansas in such cases.

ARTICLE VI

A. (1) Nothing in this Compact shall be construed as impairing the jurisdiction of Kansas over the waters of the Arkansas River that originate in Kansas and over the waters that flow from Colorado across the Stateline into Kansas.

(2) Except as otherwise provided, nothing in this Compact shall be construed as supplanting the administration by Colorado of the rights of appropriators of waters of the Arkansas River in said State as decreed to said appropriators by the courts of Colorado, nor as interfering with the distribution among said appropriators by Colorado, nor as curtailing the diversion and use for irrigation and other beneficial purposes in Colorado of the waters of the Arkansas River.

B. Inasmuch as the Frontier Canal diverts waters of the Arkansas River in Colorado west of the Stateline for irrigation uses in Kansas only, Colorado concedes to Kansas and Kansas hereby assumes exclusive administrative control over the operation of the Frontier Canal and its headworks for such purposes, to the same extent as though said works were located entirely within the State of Kansas. Water carried across the Stateline in the Frontier Canal or another similarly situated canal shall be considered to be part of the Stateline flow.

ARTICLE VII

A. Each State shall be subject to the terms of this Compact. Where the name of the State or the term "State" is used in this Compact these shall be construed to

include any person or entity of any nature whatsoever using, claiming or in any manner asserting any right to the use of the waters of the Arkansas River under the authority of that State.

B. This Compact establishes no general principle or precedent with respect to any other interstate stream.

C. Wherever any State or Federal official or agency is referred to in this Compact such reference shall apply to the comparable official or agency succeeding to their duties and functions.

ARTICLE VIII

A. To administer the provisions of this Compact there is hereby created an interstate agency to be known as the Arkansas River Compact Administration herein designated as "The Administration."

B. The Administration shall have power to:

(1) Adopt, amend and revoke by-laws, rules and regulations consistent with the provisions of this Compact;

(2) Prescribe procedures for the administration of this Compact: Provided, that where such procedures involve the operations of John Martin Reservoir Project they shall be subject to the approval of the District Engineer in charge of said Project;

(3) Perform all functions required to implement this Compact and to do all things necessary, proper or convenient in the performance of its duties.

C. The membership of the Administration shall consist of three representatives from each State who shall be appointed by the respective Governors for a term not to exceed four years. One Colorado representative shall be a resident of and water right owner in Water Districts 14 or 17, one Colorado representative shall be a resident of and water right owner in Water District 67, and one Colorado representative shall be the Director of the Colorado Water Conservation Board. Two Kansas representatives shall be residents of and water right owners in the counties of Finney, Kearny or Hamilton, and one Kansas representative shall be the chief State official charged with the administration of water rights in Kansas. The President of the United States is hereby requested to designate a representative of the United States, and if a representative is so designated he shall be an ex-officio member and act as chairman of the Administration without vote.

D. The State representatives shall be appointed by the respective Governors within thirty days after the effective date of this Compact. The Administration shall meet and organize within sixty days after such effective date. A quorum for any meeting shall consist of four members of the Administration: Provided, that at least two members are present from each State. Each State shall have but one vote in the Administration and every decision, authorization or other action shall require unanimous vote. In case of a divided vote on any matter within the purview of the Administration, the Administration may, by subsequent unanimous vote, refer the matter for arbitration to the Representative of the United States or other arbitrator or arbitrators, in which event

the decision made by such arbitrator or arbitrators shall be binding upon the Administration.

E. (1) The salaries, if any, and the personal expenses of each member shall be paid by the government which he represents. All other expenses incident to the administration of this Compact which are not paid by the United States shall be borne by the States on the basis of 60 per cent by Colorado and 40 per cent by Kansas.

(2) In each even numbered year the Administration shall adopt and transmit to the Governor of each State its budget covering anticipated expenses for the forthcoming biennium and the amount thereof payable by each State. Each State shall appropriate and pay the amount due by it to the Administration.

(3) The Administration shall keep accurate accounts of all receipts and disbursements and shall include a statement thereof, together with a certificate of audit by a certified public accountant, in its annual report. Each State shall have the right to make an examination and audit of the accounts of the Administration at any time.

F. Each State shall provide such available facilities, equipment and other assistance as the Administration may need to carry out its duties. To supplement such available assistance the Administration may employ engineering, legal, clerical, and other aid as in its judgment may be necessary for the performance of its functions. Such employees shall be paid by and be responsible to the Administration, and shall not be considered to be employees of either State.

G. (1) The Administration shall cooperate with the chief official of each State charged with the administration of water rights and with Federal agencies in the systematic determination and correlation of the facts as to the flow and diversion of the waters of the Arkansas River and as to the operation and siltation of John Martin Reservoir and other related structures. The Administration shall cooperate in the procurement, interchange, compilation and publication of all factual data bearing upon the administration of this Compact without, in general, duplicating measurements, observations or publications made by State or Federal agencies. State officials shall furnish pertinent factual data to the Administration upon its request. The Administration shall, with the collaboration of the appropriate Federal and State agencies, determine as may be necessary from time to time, the location of gaging stations required for the proper administration of this Compact and shall designate the official records of such stations for its official use.

(2) The Director, U.S. Geological Survey, the Commissioner of Reclamation and the Chief of Engineers, U.S. Army, are hereby requested to collaborate with the Administration and with appropriate State officials in the systematic determination and correlation of data referred to in paragraph G (1) of this Article and in the execution of other duties of such officials which may be necessary for the proper administration of this Compact.

(3) If deemed necessary for the administration of this Compact, the Administration may require the installation and maintenance, at the expense of water users, of measuring devices of approved type in any ditch or groups of ditches diverting water from the Arkansas

River in Colorado or Kansas. The chief official of each State charged with the administration of water rights shall supervise the execution of the Administration's requirements for such installations.

H. Violation of any of the provisions of this Compact or other actions prejudicial thereto which come to the attention of the Administration shall be promptly investigated by it. When deemed advisable as the result of such investigation, the Administration may report its findings and recommendations to the State official who is charged with the administration of water rights for appropriate action, it being the intent of this Compact that enforcement of its terms shall be accomplished in general through the State agencies and officials charged with the administration of water rights.

I. Findings of fact made by the Administration shall not be conclusive in any court or before any agency or tribunal but shall constitute prima facie evidence of the facts found.

J. The Administration shall report annually to the Governors of the States and to the President of the United States as to matters within its purview.

ARTICLE IX

A. This Compact shall become effective when ratified by the Legislature of each State and when consented to by the Congress of the United States by legislation providing substantially, among other things, as follows:

"Nothing contained in this Act or in the Compact herein consented to shall be construed as impairing or

affecting the sovereignty of the United States or any of its rights or jurisdiction in and over the area or waters which are the subject of such Compact: Provided, that the Chief of Engineers is hereby authorized to operate the conservation features of the John Martin Reservoir Project in a manner conforming to such Compact with such exceptions as he and the Administration created pursuant to the Compact may jointly approve."

B. This Compact shall remain in effect until modified or terminated by unanimous action of the States and in the event of modification or termination all rights then established or recognized by this Compact shall continue unimpaired.

IN WITNESS WHEREOF, The commissioners have signed this Compact in triplicate original, one of which shall be forwarded to the Secretary of State of the United States of America and one of which shall be forwarded to the Governor of each signatory State.

Done in the City and County of Denver, in the state of Colorado, on the fourteenth day of December, in the Year of our Lord One Thousand Nine Hundred and Forty-eight.

Henry C. Vidal
Gail L. Ireland
Harry B. Mendenhall
Commissioners for Colorado

George S. Knapp
Edward F. Arn
William E. Leavitt
Roland H. Tate
Commissioners for Kansas

Attest:
Warden L. Noe
Secretary

Approved:
Hans Kramer
Representative of the United States

APPENDIX – Exhibit 2

First Amended Complaint, filed November 13, 1989

No. 105, Original

In The
Supreme Court of the United States
October Term, 1985

Before The Honorable Arthur L. Littleworth,
Special Master

State of Kansas

Plaintiff,

v.

State of Colorado

Defendant,

and

United States of America

Defendant-Intervenor.

FIRST AMENDED COMPLAINT

(Filed Nov. 13, 1989)

Robert T. Stephan
Attorney General of Kansas
2nd Floor, Kansas Judicial Center
Topeka, Kansas 66612

John W. Campbell
Deputy Attorney General

Leland E. Rolfs
Assistant Attorney General

RICHARD A. SIMMS
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Santa Fe, New Mexico 87504
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November 10, 1989

No. 105, Original

IN THE
Supreme Court of the United States
October Term, 1985

Before The Honorable Arthur L. Littleworth,
Special Master

STATE OF KANSAS

Plaintiff,

v.

STATE OF COLORADO

Defendant,

and

UNITED STATES OF AMERICA

Defendant-Intervenor.

FIRST AMENDED COMPLAINT

The State of Kansas, by its Attorney General, the Honorable Robert T. Stephan, brings this suit against the Defendant, State of Colorado, and for its cause of action states:

1. The jurisdiction of the Court is invoked under Article III, Section 2, Clause 2 of the Constitution of the United States and Paragraph (a), Section 1251, Title 28 of the United States Code.

2. The Arkansas River is an interstate river which rises near Leadville, Colorado and flows south to Salida, Colorado, east through Canon City and Pueblo, and across southeastern Colorado into the State of Kansas.

3. In order to resolve existing and future controversies and to divide and equitably apportion the water of the Arkansas River, Congress consented to the negotiation of a compact by the states of Colorado and Kansas. Act of April 19, 1945, 59 Stat. 53. Subsequently, the Arkansas River Compact was ratified by the State of Colorado by the Act of February 19, 1949, Colo. Rev. Stat. 1963, § 149-9-1; the State of Kansas ratified the Compact by the Act of March 7, 1949, Kansas Gen. Stat. Ann. 1964, § 82a-520. The Compact was approved and enacted into federal law by the Act of Congress of May 31, 1949, 63 Stat. 145. A copy of the Arkansas River Compact was attached as Appendix A to the original Complaint in this action.

4. The principal purpose of the Arkansas River Compact was to "[e]quitably divide and apportion . . . the waters of the Arkansas River and their utilization as well as the benefits arising from the construction, operation and maintenance by the United States of John Martin Reservoir Project for water conservation purposes." 63 Stat. 145, 145, art. I.

5. While expressly recognizing the possibility of offsetting postcompact development of the waters of the Arkansas River by new regulation or increased efficiency, the Compact mandates "that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the

water users in Colorado and Kansas . . . by such future development or construction." 63 Stat. 145, 147, art. IV(D).

6. The Compact provides that "Colorado shall administer the decreed rights of water users in Colorado Water District 67 as against each other and as against all rights now or hereafter decreed to water users diverting upstream from John Martin Dam on the basis of relative priorities. . . ." 63 Stat. 145, 148, art. V(F).

7. Through the actions of its officers, agents and political subdivisions, the State of Colorado and its water users have materially depleted the usable and available stateline flows of the Arkansas River since the adoption of the Compact.

8. In spite of its duties and obligations under the Compact, since 1949 the State of Colorado has allowed and permitted substantial increases in the diversion and use in Colorado of the surface and hydrologically related ground waters of the Arkansas River, without the concomitant regulatory or conservation measures that the Compact requires to protect the states against material depletions in usable stateline flows.

9. The lack of effective administrative practices in Colorado has encouraged rather than retarded the development of postcompact depletions of the waters of the Arkansas River Basin and has resulted in ongoing, material depletions of the usable flows of the Arkansas River and substantial and irreparable injury to Kansas water users.

10. For more than twenty years, the State of Colorado has investigated and known the impact of the ground water appropriations in the Arkansas River Basin in Colorado. Approximately 150,000 acre feet per year of ground water related to the Arkansas River has been appropriated in Colorado since 1949, and the State of Colorado has intentionally disregarded the findings of its investigations to the effect that such appropriations directly and materially reduce the usable flow and availability of the Arkansas River in Colorado and Kansas. By its acquiescence in the postcompact proliferation of ground water diversions and its failure to administer the priorities of postcompact ground water diversions with existing surface diversions, Colorado has breached and continues to breach its obligations and responsibilities under the Arkansas River Compact.

11. Since the adoption of the Compact, the State of Colorado has attempted to unilaterally impede the bilateral action of the Compact Administration intended to protect Kansas' Compact apportionment and has failed to apply and administer its internal laws in order to meet its obligations under the Compact.

12. Pursuant to Article VIII(H), the Arkansas River Compact Administration has conducted an investigation of alleged Compact violations. The State of Colorado, however, through its Compact Commissioner, has rejected and continues to reject the State of Kansas' requests to investigate the impact on the Arkansas River of: 1) Colorado's substantial, postcompact ground water depletions of surface flows at the stateline; 2) the failure of Colorado to administer ground water priorities against surface priorities; 3) Colorado's artificially transferring

water from the storage pool in Trinidad Reservoir to the sediment pool and then refilling the storage pool to the detriment of downstream users; 4) the consequences of future increases in the consumption of Colorado's transmountain return flows; and 5) Colorado's unilateral rejection of the Arkansas River Compact Administration's Resolution of July 24, 1951, requiring that any reregulation of the native water of the Arkansas River be approved by the Compact Administration. Additionally, the State of Colorado refuses to enjoin its postcompact ground water appropriations and resulting surface depletions during the pendency of investigation of the effects of such appropriations, in spite of the irrefutable fact that those appropriations materially deplete the usable and available flows of the Arkansas River. Accordingly, the State of Colorado has used and will continue to use the pending administrative investigation as the basis for prolonging the substantial and irreparable injury to the State of Kansas by wrongfully depriving the State of Kansas and its citizens of the waters of the Arkansas River to which they are entitled under the Compact.

13. The State of Colorado has failed and continues to fail to make deliveries of releases to which Kansas is entitled from John Martin Reservoir by an equivalent in stateline flow, as required by Article V(E)3 of the Compact, and in violation of Articles V(E)4 and V(H)2.

14. Grave and irreparable injury to the State of Kansas and its citizens who were entitled to receive and use the water apportioned to them by the Arkansas River Compact has been caused by the acts and conduct of the State of Colorado, its officers, citizens, and political subdivisions in failing, neglecting, and refusing to deliver

water to Kansas in the usable and available quantities apportioned to it by the Compact.

15. Grave and irreparable injury will be suffered in the future by the State of Kansas and its citizens unless relief is afforded by this Court to prevent the State of Colorado, its officers, citizens, and political subdivisions from using and withholding water which Kansas is entitled to and which Colorado has heretofore agreed to deliver pursuant to the terms and provisions of the Arkansas River Compact.

16. The State of Kansas has sustained damages as follows:

(a) General damages arising from breach of the Arkansas River Compact by the State of Colorado, consisting of the value of Kansas' apportioned share of the Arkansas River lost to Kansas as a result of Colorado's depletions of the Arkansas River resulting from its violations of the Arkansas River Compact in an amount to be proved at trial.

(b) Special damages arising from breach of the Arkansas River Compact by the State of Colorado consisting of depletions of the Ogallala aquifer, a non-renewable resource, in the State of Kansas, resulting from Colorado's violations of the Arkansas River Compact in an amount to be proved at trial.

17. The State of Kansas has no effective remedy to enforce its rights under the Arkansas River Compact against the State of Colorado other than through the exercise of original jurisdiction in this case.

WHEREFORE, the State of Kansas respectfully prays that the Court issue its decree commanding the State of Colorado, its officers, citizens, and political subdivisions to deliver the waters of the Arkansas River in accordance with the provisions of the Arkansas River Compact and providing for such other and further relief as the Court may deem appropriate; and WHEREFORE, the State of Kansas prays that the Court award all general and special damages resulting from violations of the Arkansas River Compact by the State of Colorado, and for all other relief that the Court deems just and proper.

Respectfully submitted,

ROBERT T. STEPHAN
Attorney General of Kansas

JOHN W. CAMPBELL
Deputy Attorney General

LELAND E. ROLFS
Assistant Attorney General

/s/ Richard A. Simms
RICHARD A. SIMMS
Special Assistant Attorney General
Counsel of Record

JAY F. STEIN
Special Assistant Attorney General

Simms & Stein, P.A.
First Northern Plaza
121 Sandoval Street
Post Office Box 280
Santa Fe, New Mexico 87504
(505) 983-3880

CERTIFICATE OF SERVICE

I, Richard A. Simms, hereby certify that I caused a copy of the foregoing Kansas' First Amended Complaint to be served by federal express this 10th day of November, 1989 to:

The Honorable Arthur L. Littleworth
Special Master, United States Supreme Court
Best, Best & Krieger
3750 University Avenue
Riverside, California 92502

The Honorable Roy Romer
Governor of Colorado
State Capitol 136
Denver, Colorado 80203

The Honorable Duane Woodard
Attorney General of Colorado
1525 Sherman St. 300
Denver, Colorado 80203

David Robbins, Esquire
Hill and Robbins
100 Blake Street Building
1441 Eighteenth Street
Denver, Colorado 80202

Honorable Charles Fried
Solicitor General
Department of Justice
Washington, D.C. 20530

Patricia L. Weiss, Esquire
U.S. Department of Justice
Land and Natural Resources Division
P.O. Box 663
Washington, D.C. 20044-0663

Andrew F. Walch, Esquire
United States Department of Justice
Land & Natural Resources Division
1961 Stout Street
Post Office Drawer 3607
Denver, Colorado 80294

/s/ Richard A. Simms
Richard A. Simms
Special Assistant Attorney General
Counsel of Record

APPENDIX – Exhibit 3

Colorado's Answer to the First Amended Complaint and Counterclaim, filed November 27, 1989

IN THE SUPREME COURT OF THE UNITED STATES
No. 105, Original
October Term 1985

STATE OF KANSAS,

Plaintiff,

v. (Filed Nov. 27, 1989)

STATE OF COLORADO,

Defendant,

and

UNITED STATES OF AMERICA,

Defendant-Intervenor.

COLORADO'S ANSWER TO THE FIRST AMENDED COMPLAINT AND COUNTERCLAIM

ANSWER

Defendant, the State of Colorado, for its answer to the First Amended Complaint filed in the above-captioned action by Plaintiff, the State of Kansas, states:

1. Colorado admits the Court has jurisdiction under the allegations in paragraph 1 of the First Amended Complaint. Colorado denies that this is an appropriate case for the Court to exercise such jurisdiction because Kansas has failed to exhaust its administrative remedies under Article VIII of the Arkansas River Compact.

2. Colorado admits the allegations in paragraph 2 of the First Amended Complaint.

3. Colorado admits the allegations in paragraph 3 of the First Amended Complaint.

4. Colorado admits that one of two major purposes of the Arkansas River Compact is quoted in paragraph 4 of the First Amended Complaint. Colorado denies the allegations of paragraph 4 insofar as they assert that the purpose set forth in Article I-B of the Compact is the "principal" purpose of the Arkansas River Compact.

5. Colorado admits that a portion of Article IV-D of the Compact is quoted in paragraph 5 of the First Amended Complaint. Colorado denies the allegations of paragraph 5 insofar as they assert Kansas' interpretation of Article IV-D.

6. Colorado admits that a portion of the first sentence of Article V-F of the Arkansas River Compact is quoted in paragraph 6 of the First Amended Complaint. The first sentence of Article V-F in its entirety reads as follows:

> In the event the Administration finds that within a period of fourteen (14) days the water in the conservation pool will be or is liable to be exhausted, the Administration shall forthwith notify the State Engineer of Colorado, or his duly authorized representative, that commencing upon a day certain within said fourteen (14) day period, unless a change of conditions justifies cancellation or modification of such notice, Colorado shall administer the decreed rights of water users in Colorado Water District 67 as against each other and as against all rights now or hereafter decreed to water users diverting upstream from John Martin Dam on the basis of relative priorities in the same manner in which

> their respective priority rights were administered by Colorado before John Martin Reservoir began to operate and as though John Martin Dam had not been constructed.

Colorado affirmatively alleges that the Arkansas River Compact Administration by resolution in 1980 adopted an operating plan for John Martin Reservoir which modifies the method by which the Administration finds that the water in the conservation pool is exhausted for the purposes of Article V-F.

7. Colorado denies the allegations in paragraph 7 of the First Amended Complaint.

8. Colorado denies the allegations in paragraph 8 of the First Amended Complaint.

9. Colorado denies the allegations in paragraph 9 of the First Amended Complaint.

10. Colorado admits that for more than twenty years its agencies or officials have investigated ground water appropriations in the Arkansas River Basin in Colorado. Colorado denies the remaining allegations of paragraph 10 of the First Amended Complaint.

11. Colorado denies the allegations in paragraph 11 of the First Amended Complaint.

12. Colorado admits that the Arkansas River Compact Administration was in the process of conducting an investigation of alleged Compact violations pursuant to Article VIII-H of the Arkansas River Compact at the time Kansas commenced this proceeding on December 16, 1985, and that Colorado refused to enjoin all post-compact ground water appropriations in Colorado during the

pendency of the investigation. Colorado admits that the Colorado representatives to the Arkansas River Compact Administration rejected requests by the Kansas representatives to investigate the consequences of possible future increases in the consumption of Colorado's "transmountain" return flows. Colorado denies the remaining allegations of paragraph 12 of the First Amended Complaint.

13. Colorado denies the allegations in paragraph 13 of the First Amended Complaint.

14. Colorado denies the allegations in paragraph 14 of the First Amended Complaint.

15. Colorado denies the allegations in paragraph 15 of the First Amended Complaint.

16. Colorado denies the allegations in paragraph 16 of the First Amended Complaint.

17. Colorado denies the allegations in paragraph 17 of the First Amended Complaint.

AFFIRMATIVE DEFENSES

1. Kansas failed to exhaust its administrative remedies under Article VIII of the Arkansas River Compact.

2. Kansas' claims against Colorado are barred by accord and satisfaction, failure to mitigate damages, laches, estoppel, waiver, statute of limitations, or the doctrine of unclean hands.

3. To the extent post-compact developments were beyond the control of the State of Colorado, Colorado is not liable for those acts.

4. Article V-E(5) of the Arkansas River Compact provides there shall be no allowance or accumulation of credits or debits for or against either state.

5. With regard to Kansas' claim that Colorado and its water users have materially depleted the usable and available stateline flows of the Arkansas River since the adoption of the Compact to the injury of water users in Kansas under the Compact, Colorado asserts that irrigation in the Arkansas River basin in Colorado has declined since the adoption of the Compact and that acreage under irrigation in western Kansas has increased at least fivefold in the same period, from approximately 65,000 acres in 1948 to 350,000 acres in 1980. Kansas seeks to have this Court rewrite the Arkansas River Compact to impose a new stateline delivery obligation on Colorado so as to maintain a post-compact well economy in western Kansas, all at the expense of Colorado water users, contrary to the express terms of the Compact.

6. Waters brought into the Arkansas River basin from other river basins are not apportioned to Kansas under the Arkansas River Compact and Kansas has no claim or right to such waters.

7. In 1980, the Arkansas River Compact Administration approved an operating plan for John Martin Reservoir pursuant to which water stored in the conservation pool of the reservoir is transferred into separate storage accounts for Kansas and ditches in Colorado Water District 67 at agreed upon rates and is apportioned into the accounts in agreed upon percentages. Based upon a series of agreements among Colorado users, after water stored

in the conservation pool is fully transferred to the separate storage accounts, but not necessarily released from the reservoir, Colorado reverts to administration of decreed priorities and the decreed rights of water users in Colorado Water District 67 are administered as against rights decreed to water users diverting upstream from John Martin Dam on the basis of relative priorities in the same manner as though John Martin Dam had not been constructed. The Colorado representatives approved the operating plan in 1980 and have allowed the operating plan to remain in effect from year-to-year thereafter, to the substantial benefit of Kansas water users, based upon the aforesaid agreements among Colorado water users to determine when a "call" by ditches in Colorado Water District 67 will be enforced above John Martin Reservoir. Those agreements were in turn based on an agreement to permit storage of historical direct-flow winter diversions upstream from John Martin Reservoir. Kansas has accepted the benefits of the 1980 operating plan and agreed to its terms with knowledge of the agreements among Colorado water users and with knowledge that the 1980 operating plan would change the regimen of the Arkansas River. Therefore, by having accepted the benefits of the 1980 operating plan, Kansas is barred from asserting that any reregulation of the native waters of the Arkansas River be approved by the Compact Administration based upon the Administration's Resolution of July 24, 1951.

8. With regard to Kansas' allegation that Colorado, through its Compact "Commissioner", has rejected and

continues to reject Kansas' requests to investigate Colorado's "unilateral rejection" of the Arkansas River Compact Administration's Resolution of July 24, 1951, Colorado denies that the Resolution has any binding effect on Colorado. In the alternative, the Resolution was amended by the Administration on January 4, 1982. Further, Kansas failed to raise an objection to the winter storage program in Pueblo Reservoir for six years after it began operation in 1975 with the full knowledge of Kansas and the Administration.

COUNTERCLAIM

Defendant, the State of Colorado, by its Attorney General, asserts the following counterclaim against Plaintiff, the State of Kansas:

1. The Court has jurisdiction of this counterclaim under Article III, Section 2, Clause 2 of the Constitution of the United States, and Paragraph (a), Subsection (1), Section 1251, Title 28 of the United States Code.

2. The Arkansas River is an interstate stream which rises in the Rocky Mountains near Leadville, Colorado, then flows southeasterly to Salida, Colorado, then east through Canon City to Pueblo, Colorado, then across the plains of eastern Colorado into the State of Kansas.

3. In order to settle existing disputes and to remove causes of future controversy concerning the waters of the Arkansas River and to equitably divide and apportion between the States of Colorado and Kansas the waters of the Arkansas River, as well as the benefits arising from the construction, operation, and maintenance of John Martin Reservoir for water conservation purposes, the States of

Colorado and Kansas ratified the Arkansas River Compact, which Compact was approved by the United States Congress by Act of May 31, 1949, 63 Stat. 145.

4. Article V-E(2) of the Arkansas River Compact provides: "Water released upon concurrent or separate demands shall be applied promptly to beneficial use unless storage thereof downstream [from John Martin Reservoir] is authorized by the [Arkansas River Compact] Administration."

5. On information and belief, the state officials charged with administration of water rights in Kansas have allowed water released from John Martin Reservoir upon demand by Kansas under Article V of the Arkansas River Compact to be stored downstream in Lake McKinney in Kansas rather than being applied promptly to beneficial use, in violation of the provisions of Article V-E(2) of the Compact.

6. Subsequent to the approval of the Arkansas River Compact by the United States Congress in 1949, state officials charged with the administration of water rights in Kansas have allowed the construction of wells and have permitted ground water appropriations in Kansas that have materially depleted the usable quantity or availability for use to the surface water users in Kansas under the Compact. Those depletions caused Kansas to make additional demands for releases of water stored in John Martin Reservoir pursuant to the Compact to the detriment of water users in Colorado.

7. Irreparable injury to the State of Colorado and water users in Colorado under the Compact has been caused by the acts and conduct of the State of Kansas, its officers, and citizens in permitting the use of the waters

of the Arkansas River in violation of the terms of the Compact.

WHEREFORE, having fully answered and having asserted its affirmative defenses and counterclaim, Colorado prays that the Court grant judgment for Colorado and against Kansas on the claims of Kansas, that the Court issue its decree compelling the State of Kansas, its officers, and citizens to comply with the provisions of the Arkansas River Compact, that Colorado have and recover its reasonable costs, and for such other and further relief as the Court may deem proper under the circumstances.

DUANE WOODARD
Attorney General of Colorado

CHARLES B. HOWE
Chief Deputy Attorney General

RICHARD H. FORMAN
Solicitor General

HILL & ROBBINS, P.C.

/s/ David W. Robbins
DAVID W. ROBBINS
Special Assistant Attorney General
Counsel of Record
DENNIS M. MONTGOMERY
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1441 – 18th Street, #100
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Telephone: 303-296-8100

Attorneys for Defendant
State of Colorado

CERTIFICATE OF SERVICE

I, David W. Robbins, hereby certify that I am a member of the Bar of this Court and Counsel of Record for the State of Colorado and that on the 22nd day of November, 1989, I caused a true and correct copy of Colorado's Answer and Counterclaim to Kansas' First Amended Complaint to be placed in the United States mail, first class postage prepaid, addressed as follows:

The Honorable Arthur L. Littleworth
(original and one copy)
Special Master
Best, Best & Krieger
3750 University Avenue
Riverside, California 92502

Richard A. Simms, Esq.
Simms & Stein
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Patricia Weiss, Esq.
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/s/ David W. Robbins
DAVID W. ROBBINS
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Counsel of Record

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Denver, Colorado 80202
Telephone: 303-296-8100

Attorneys for Defendant
State of Colorado

APPENDIX – Exhibit 4

Answer of the United States to the First Amended Complaint, filed January 15, 1990

No. 105 Original

IN THE
SUPREME COURT OF THE UNITED STATES
OCTOBER TERM 1989

BEFORE THE HONORABLE
ARTHUR L. LITTLEWORTH,
SPECIAL MASTER

STATE OF KANSAS, PLAINTIFF

v.

STATE OF COLORADO, ET AL.

ANSWER OF THE UNITED STATES TO THE FIRST AMENDED COMPLAINT

(Filed Jan. 15, 1990)

KENNETH W. STARR
Solicitor General

RICHARD B. STEWART
Assistant Attorney General

PATRICIA L. WEISS
ANDREW F. WALCH
Attorneys

Department of Justice
Washington, D.C. 20530
(202) 633-2217

IN THE
SUPREME COURT OF THE UNITED STATES
OCTOBER TERM 1989

BEFORE THE HONORABLE
ARTHUR L. LITTLEWORTH,
SPECIAL MASTER

No. 105 Original

STATE OF KANSAS, PLAINTIFF

v.

STATE OF COLORADO, ET AL.

ANSWER OF THE UNITED STATES TO THE FIRST AMENDED COMPLAINT

The United States, in response to the First Amended Complaint of the State of Kansas, states:

1. The averments of paragraph 1 are conclusions of law to which no response is required.

2-3. The averments of paragraphs 2 and 3 are admitted.

4. The United States admits that one of the purposes of the Arkansas River Compact is as quoted in paragraph 4 of the complaint, and avers that the Compact itself is the best evidence of its contents. Act of May 31, 1949, 63

Stat. 145. The remaining averment of paragraph 4 is a conclusion of law to which no response is required.

5. The United States admits that the portion of Art. IV(D) of the Arkansas River Compact is as quoted in paragraph 5 of the complaint and avers that the Compact itself is the best evidence of its contents. The remaining averments of paragraph 5 are conclusions of law to which no response is required.

6. The United States admits that the portion of Article V(F) of the Arkansas River Compact is as quoted in paragraph 6 of the complaint and avers that the Compact itself is the best evidence of its contents. The United States avers that the Arkansas River Compact Administration by resolution in 1980 adopted an operating plan for John Martin Reservoir which modifies the method by which the Administration finds that the water in the conservation pool is exhausted for the purposes of Article V(F) of the Compact.

7-11. The United States is without knowledge or information sufficient to form a belief as to the truth of the averments of paragraph 7-11 of the complaint.

12. The United States admits the averments of the first sentence of paragraph 12 and that the State of Colorado, through its Compact Commissioner, has at various times declined to approve investigations of the impact on the Arkansas River of certain of the matters itemized in paragraph 12. The United States is without knowledge or information sufficient to form a belief as to the truth of the remaining averments of paragraph 12.

13-17. The United States is without knowledge or information sufficient to form a belief as to the truth of the averments of paragraphs 13-17 of the complaint.

AFFIRMATIVE DEFENSES

1. The Trinidad Project is a multi-purpose project constructed and operated by the United States Army Corps of Engineers in accordance with federal laws and operating principles developed by the Bureau of Reclamation and approved by the States of Colorado and Kansas. Pursuant to a request by the Arkansas River Compact Administration, the United States Bureau of Reclamation has undertaken a review of the Trinidad Project operating principles and has issued a final report recommending certain modifications of the operating principles. Adoption of the Bureau of Reclamation's report by the Arkansas River Compact Administration and implementation of the recommendations contained in the report to insure that the waters of the Arkansas River shall not be materially depleted in usable quantity or availability for use by the water users in Colorado and Kansas will moot plaintiff's claims with respect to the Trinidad Project.

2. Pueblo Dam and Reservoir are features of the Fryingpan-Arkansas Project, a multipurpose project authorized by Congress in 1962 in "substantial accordance with the engineering plans" set forth in House Document 83-187. Act of August 16, 1962, 76 Stat. 389, as amended by Act of October 27, 1974, 88 Stat. 1486, 1497, and Act of November 3, 1978, 92 Stat. 2493. The engineering plans set forth in H.R. Doc. No. 83-187 include a winter storage program at Pueblo Reservoir. Accordingly,

with respect to any claim that the winter storage program at Pueblo Reservoir should have been submitted to the Arkansas River Compact Administration for approval, the complaint fails to state a claim upon which relief may be granted, for the winter storage program is a Congressionally authorized feature of the Fryingpan-Arkansas Project.

3. The winter storage program has been in place at Pueblo Reservoir since 1976, with the knowledge of the Arkansas River Compact Administration, and the repayment contract for the Project between the United States and the Southeastern Colorado Water Conservancy District contains specific provisions for the storage of winter water. Accordingly, plaintiff's claim that the winter storage program should have been submitted to the Arkansas River Compact Commission for approval is barred by the equitable doctrine of laches.

WHEREFORE, the United States respectfully prays that the Court issue an order protecting the rights of the United States in the Trinidad Project and the Fryingpan-Arkansas Project, and for such other and further relief as the Court may deem just and proper.

Respectfully submitted.

KENNETH W. STARR
Solicitor General

RICHARD B. STEWART
Assistant Attorney General

PATRICIA L. WEISS
ANDREW F. WALCH
Attorneys

JANUARY 1990

IN THE SUPREME COURT OF THE UNITED STATES
OCTOBER TERM, 1989

STATE OF KANSAS Plaintiff, v. STATE OF COLORADO Defendant, vs. and UNITED STATES OF AMERICA Defendant-Intervenor	)	No. 105, Original

CERTIFICATE OF SERVICE
(Filed Jan. 15, 1990)

It is hereby certified that all parties required to be served have been served copies of the ANSWER OF THE UNITED STATES TO THE FIRST AMENDED COMPLAINT, by first-class mail, postage prepaid, this 12th day of January, 1990.

[SEE ATTACHED SERVICE LIST]

/s/ Kenneth W. Starr
KENNETH W. STARR
SOLICITOR GENERAL

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The Honorable Arthur L. Littleworth
Special Master
United States Supreme Court
Best, Best & Krieger
3750 University Ave.
Riverside, CA 92502

The Honorable Roy Romer
Governor of Colorado
State Capitol 136
Denver, CO 80203

APPENDIX – Exhibit 5

Decision of Special Master on Colorado Motion to Stay,
filed October 21, 1988

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Petitioner, v. STATE OF COLORADO, Respondent.	)	No. 105, Original October Term, 1985

DECISION OF SPECIAL MASTER ON COLORADO MOTION TO STAY

(Filed Oct. 21, 1988)

Colorado filed a Motion to Stay Based on Kansas' Failure to Exhaust Its Administrative Remedies. The Motion dealt with two of the several issues in the Complaint: i.e., post-Compact well development in Colorado, and the operation of Trinidad Reservoir. The Motion was fully briefed, and oral argument was held in the Federal Court of Appeal in Pasadena, California on September 28, 1988. David W. Robbins, Esq. argued the Motion for Colorado, and Richard A. Simms responded for Kansas.

Kansas acknowledges that it has an obligation, before seeking judicial relief, to exhaust its administrative remedies under the Arkansas River Compact. The Compact was ratified by the respective legislatures of each state, and approved by Congress in 1949. (Act of May 31, 1949, 63 Stat. 145) The Compact Administration is similar to that discussed in *State of Texas vs. State of New Mexico* (1983) 462 U.S. 554, 77 L.Ed.2d 1; 103 S.Ct. 2558. The Administration consists of three representatives from each state, but each state ". . . shall have but one vote in

the Administration and every decision, authorization or other action shall require unanimous vote." (Article VIII-D) While a representative of the United States chairs the Administration, he has no vote. (Article VIII-C)

Only two specific remedies for alleged Compact violations are provided for in the Compact. It provides that violations shall be "promptly investigated" by the Administration, although the procedure for the investigation and any remedies still require agreement between the states. (Article VIII-H) In addition, disputes "may," by unanimous vote, be referred for arbitration. (Article VIII-D) Both parties agree that the exhaustion test under the circumstances involved here is whether a state has made a "reasonable effort" to proceed first through the Compact Administration. Colorado also acknowledges that it is proper to seek judicial relief if an investigation by the Administration reaches an impasse. (Colo. Br., p. 21) Colorado, as part of its Motion, filed four large volumes of Appendix documents, going back several years, which appear to include the Compact Administration record with respect to post-Compact well development and the operations of Trinidad Reservoir. Both parties relied upon this record in their briefs and arguments.

Kansas argues first that the exhaustion issue was actually decided by the United States Supreme Court when it authorized the filing of Kansas' Complaint. Kansas moved to file its Complaint on December 16, 1985, alleging that the State of Colorado and its water users had materially depleted the usable and available stateline flows of the Arkansas River in violation of the Compact.

Kansas further alleged that Colorado had blocked Kansas' efforts to have the Compact Administration investigate its complaints.

On February 18, 1986, Colorado filed a brief in opposition to Kansas' Motion for Leave to File Complaint. The thrust of that brief was that Kansas had not made a "reasonable effort" to resolve its complaints through the Compact Administration, and that absent such an effort, the Supreme Court should decline to hear the matter. (p. 1) Colorado stated that the question presented was whether Kansas had met its burden " . . . to demonstrate that a pending investigation of the Arkansas River Compact Administration is not an adequate means to vindicate its allegations of Compact violations." (p. 3) In its brief, citing certain documentary evidence, Colorado alleged that there was a "pending investigation" by the Compact Administration, that the Administration was not deadlocked or unable to act, and that Colorado had not refused to investigate Kansas' allegations. (pp. 8-9) However, Colorado did not file with the Supreme Court the same voluminous administrative record used to support its Motion before the Special Master.

In response to Colorado's brief, Kansas on March 3, 1986 filed a new motion in the alternative, either for leave to file its complaint, or to compel an investigation by the Compact Administration pursuant to Article VIII-H. In its supporting brief, Kansas outlined in further detail its view of efforts taken within the Compact Administration, and the alleged frustration of the administrative procedure. Thus, the question of whether the administrative process had been properly exhausted was clearly an issue in the pleadings before the Supreme Court.

The Supreme Court's Order stated simply:

> "The motion for leave to file a bill of complaint is granted. Defendant is allowed sixty days within which to file an answer."

Kansas contends that the Court made a choice between the alternatives presented in its Motion, and thereby disposed of the exhaustion issue. Colorado, on the other hand, argues that the Court's silence is not a basis for inferring intent, and had the Court intended to decide the exhaustion issue, it would have ordered argument and decided the issue explicitly.

The requirement of a motion for leave to file a complaint and the requirement of a brief in opposition do enable the Supreme Court to dispose of matters at a preliminary stage. (*Ohio v. Kentucky* (1973) 410 U.S. 641, 644) As the Court has explicitly recognized, its objective in original cases is to have the parties, as promptly as possible, reach and argue the merits of the controversy presents. (*Id.*) To this end, the Court has strongly suggested that granting an original plaintiff's motion for leave to file complaint amounts to a rejection of arguments that the case should be dismissed. (*Maryland, et al. v. State of Louisiana* (1981) 451 U.S. 725, 740, fn. 16) Further, in the analogous case of *Texas v. New Mexico* (1983) 462 U.S. 554, the Court intimated that "fundamental structural considerations," such as an interstate compact that accords each signatory state the power to veto authoritative commission action, may abbreviate inquiry into the question of whether an available remedy exists at the administrative level. (462 U.S. 54, 568-570)

It is not necessary, however, to decide Colorado's present Motion on the basis of the Supreme Court order. The Special Master is convinced that Kansas did make a reasonable effort to pursue its complaints through the Compact Administration, but because of the inherent limitations in that procedure, the parties reached an impasse. Indeed, the briefs and oral argument on the Motion dealt primarily with the substance of the efforts before and by the Compact Administration, and not upon the Supreme Court order.

First, with respect to post-Compact well development, Kansas cites numerous law reviews and other secondary sources to show that unregulated well development, and its impact on surface water users, has been a problem for many years. (Kan. Br., pp. 30-31) By 1983 Kansas began its own study of the decline in flows of the Arkansas River, and the development of upstream wells in Colorado as a possible cause. Completed in 1984, that study concluded that for the period 1974 to 1981 a conservative estimate of the stateline depletions due to post-Compact wells in Colorado was 40,000 to 50,000 acre-feet per year. (Appendix Exh. 21, p. iii) Colorado and the Compact Administration were aware of that study. Nonetheless, Colorado contends that Kansas did not formally seek a Compact investigation of this issue until February of 1985. (Colo. Closing Br., pp. 21, 27) Assuming that to be true for purposes of this Motion, there is no question that on March 28, 1985 the Compact Administration directed a formal investigation of the depletion of stateline flows. A number of potential causes were to be investigated, including specifically "well development of the waters of the Arkansas River in Colorado," as well as

"the operation of the Trinidad Dam and Reservoir project." (Appendix Exh. 28, attached Exh. L)

The Compact Administration Resolution directed that the investigation be undertaken by a committee consisting of the Director of the Colorado Water Conservation Board and the Chief Engineer of Kansas, or their respective designees. Thus, the same unanimity requirements that limited the Administration itself were carried over into the structure of this investigation. Finally, the March 28 Resolution called for the investigation to be completed by the next annual meeting of the Compact Administration on December 10, 1985.

The engineers for the two states met promptly, but were unable initially to agree upon a scope of work for the investigation. (Appendix Exh. 29) At their next meeting they agreed to defer consideration of a complete scope of work, and defined instead a preliminary scope that included the compilation of certain data and construction of a series of mass diagrams. (Appendix Exh. 30, p. 2) The mass diagrams were presented at their meeting on July 12, 1985, but again the two engineers were unable to agree "about what the diagrams did or did not show." (Appendix Exh. 32, p. 4) Finally they decided to prepare and exchange separate reports analyzing the mass curves, and recommended that the Compact Administration hold a special meeting on October 8, 1985 to receive such report as the committee might be ready to make. (*Ibid.*) The committee met once again on September 17, ". . . but was unable to agree on the conclusions to be drawn from the single and double mass diagrams and on what further investigation, if any, should be undertaken." (Appendix

Exh. 34, pp. 4) J. William McDonald, the Colorado representative on the committee, reported to the Compact Administration that the committee had "reached an impasse" at its September 17 meeting. (Appendix Exh. 36, p. 2)

Against this background, the Compact Administration met on October 8, 1985. The Colorado representative acknowledged that there had been a "substantial decline in usable stateline flows starting in 1974." (Appendix Exh. 36, p. 4) However, he did not see post-Compact well development as the cause. He stated:

> "It seems to me that all the engineering shows thus far is that there has been a decline in usable stateline flows starting in 1974, which corresponds it appears to me, to a decline in tributary inflow rather than to well development or any other beneficial development in the Arkansas River basin in Colorado." (Appendix Exh. 37, p. 32)

Colorado therefore took the position that the investigation should first examine neither the well issue nor the operations of Trinidad Reservoir, but (1) reduced diversions by ditches in Colorado Water District 67; (2) the operating plan for John Martin Reservoir; (3) decreased plains precipitation; and (4) soil conservation measures. (Appendix Exh. 37, p. 35)

With respect to well development, the Colorado representative stated:

> "In that context I do not believe it is appropriate to launch an investigation of well pumping in Colorado as David (David Pope, Kansas State Engineer) has urged in his second report until

> we have determined whether the declines in usable stateline flows might be the result of other causes, which I believe to be more likely than the causes which David has addressed. . . . And it has been my position therefore that the investigation should indeed continue, but it should start first with those factors which at this point in time appear to be most likely explanations for the decline in usable stateline flows." (Appendix Exh. 37, pp. 31-32)

Kansas, on the other hand, urged that the investigation proceed to examine ten possible causes for the decline in stateline flows, including all those suggested by Colorado, and including well development and the operations of Trinidad Reservoir. (Appendix Exh. 37, pp. 35-36) The Compact Administration finally adopted a Resolution that the committee continue its investigation only of those matters mutually agreed upon, that is, the four items suggested by Colorado. (Appendix Exh. 37, pp. 37-38)

Colorado now argues that it did not "rule out" an investigation of the impact of post-Compact wells on stateline flows, but neither did it commit that Kansas' complaints would ever be investigated. (Colo. Closing Br., p. 28; Appendix Exh. 37, p. 33) The facts are that in March the Compact Administration directed an investigation of post-Compact well development and the operations of Trinidad Reservoir, as possible causes among others for the decline in stateline flows. The investigation was to have been completed within the year. Yet by October, at Colorado's insistence, those two matters had been dropped from the committee's investigation agenda. Kansas had a right to have its complaints "promptly

investigated" and not sidetracked by Colorado's belief that other factors might have more likely caused the decline in stateline flows. (Article VIII-H)

The well issue came up again at the Compact Administration's annual meeting on December 10, 1985. Kansas asked Colorado directly whether it would be ". . . willing to immediately begin a prompt and expeditious investigation of post-Compact alluvial well development in the Arkansas River Basin in Colorado. (Appendix Exh. 39, p. 107) Kansas never received an affirmative reply.

At that meeting, Kansas also presented a report from the nationally known consulting firm of S. S. Papadopulos & Associates. The report concluded that the investigation methodology proposed by Colorado, namely, focusing first on separate factors like climatic conditions, would not "produce meaningful conclusions regarding the alleged violations"; that the various possible factors must be examined contemporaneously, "regardless of preconceived notions as to the relative effects of any one factor"; and that studies had demonstrated that groundwater development and reservoir regulation "impact significantly the streamflow conditions within the river system," and "must be included" in order properly to investigate Kansas' allegation. (Appendix Exh. 39, Exh. E, pp. 5-6)

Kansas filed its motion with the Supreme Court six days later on December 16, 1985, having previously announced after the October 8 meeting that the States were at an impasse, and that such an action was being prepared. (Appendix Exh. 38)

Turning now to the operations of Trinidad Reservoir, Colorado concedes that Kansas first complained about this issue in 1980. (Colo. Br. pp. 9, 24) Through an administrative practice known as "rollover," Kansas alleged that additional water was stored in Trinidad Reservoir, in violation of the Compact. The Administration found that the amount involved for 1979 was 18,290 acre-feet. (Appendix Exh. 13) At a Compact Administration meeting in 1980, Kansas sought to have the Administration recommend that the State Engineer of Colorado order the release of such stored water, but Colorado voted "no." (Appendix Exh. 13, Colo. Br. p. 9) The rollover practice was continued, and Kansas contends that by 1982 some 58,514 acre-feet of water had been illegally stored. (Kansas' Response, p. 27) Admittedly, Kansas sought arbitration of this issue in 1982, in 1983 and again in 1985. (Appendix Exh. 16, pp. 78, 87; Exh. 28, pp. 168-170) Colorado declined, due to the "failure of the State of Kansas to identify the underlying factual basis for its claims." (Appendix Exh. 16, pp. 88, 85)

In 1983, therefore, Kansas undertook its own study, hiring Simons, Li & Associates, Inc. That study was completed in February, 1984 and concluded in part:

> "Since 1979, the Trinidad Project has been operated in a manner different than that envisioned by the Bureau of Reclamation and that approved by the Compact Administration. It is estimated that these deviations in the Trinidad Project operation have caused an additional 26,000 to 35,000 acre-feet of depletions to downstream water users." (Appendix Exh. 21, p. iii)

As previously indicated, the Trinidad issue was finally included as part of the investigation authorized by the Compact Administration on March 28, 1985. However, like the well development issue, Trinidad was dropped on October 8, 1985.

Colorado's principal argument with respect to Trinidad Reservoir is that reservoir operations are currently being reviewed and analyzed by the United States Bureau of Reclamation. Colorado claims that the Bureau's study, which was begun in 1984, embraces all of Kansas' complaints. The study was requested by the Compact Administration following the Simons, Li report, but was also independently required as part of a five-year review procedure. The Bureau's final report is expected at any time. Two draft reports have been issued earlier, and Kansas maintains that there are both "methodological and legal objections" to the last draft. (Kansas Response, p. 29) However, the scope and efficacy of the Bureau's study are not the issue. There is nothing to show that a routine, though timely, study by the Bureau constitutes a Compact investigation. Indeed, the Compact administration presumably would not have included the operations of Trinidad Reservoir within its March 28, 1985 investigation if the Bureau's study had been intended to serve that function. The Bureau's study may provide valuable data on the issue, but it is not a substitute for action by the Compact Administration to investigate Kansas' complaints.

The decline of Arkansas River flows into Kansas appears to be admitted. At issue are the cause or causes, and whether Compact violations are involved. Kansas has made good faith allegations of such violations, and

has presented preliminary studies to support its position. Certainly the future effectiveness of the Compact Administration requires timely resolution of these allegations. However, the Administration structure is such that even a preliminary investigation of the allegations has not proceeded. By exercising its veto on the Commission, though done in good faith, Colorado has effectively prevented "authoritative Commission action." (cf. *Texas v. New Mexico, supra,* 462 U.S. 554, 568)

The Special Master believes that Kansas has met its obligations under the law, and that returning these issues to the Compact Administration would not prove effective, nor would further delay be fair. Accordingly, Colorado's Motion is hereby denied.

DATED: October 21, 1988

/s/ Arthur L. Littleworth
Arthur L. Littleworth
Special Master

PROOF OF SERVICE BY MAIL
(1013A, 2015.5 C. C. P.)

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the county aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business address is:

BEST, BEST & KRIEGER, 3750 University Avenue, 400 Mission Square, P.O. Box 1028, Riverside, CA 92502. *On* October 21, 1988, *I served the within* DECISION OF SPECIAL MASTER ON COLORADO MOTION TO STAY *on the* interested parties listed below *in said action, by placing a true copy thereof enclosed in a sealed envelope with postage thereon fully prepaid, in the United States mail at* Riverside, California *addressed as follows:*

Richard A. Simms, Esq.
Attorney at Law
P.O. Box 280
Santa Fe, NM 87504

David W. Robbins, Esq.
Hill & Robbins
100 Blake Street Building
1441 Eighteenth Street
Denver, CO 80202

Patricia Weiss, Esq.
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Washington, D.C. 20044

Andrew F. Walch, Esq.
U. S. Department of Justice
Land & Natural Resources Division
3305 Federal Building
650 Capitol Mall
Sacramento, CA 95814

I declare, under penalty of perjury, that the foregoing is true and correct.

Executed on October 21, 1988 *(date)* *at* Riverside, *(Place)* *California*

/s/ Sandra L. Simmons
Signature
Sandra L. Simmons

APPENDIX – Exhibit 6

Order re Kansas Motion to Bifurcate Proceedings,
filed January 2, 1990

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant.	)	No. 105, Original October Term, 1985

ORDER RE KANSAS MOTION TO BIFURCATE PROCEEDINGS

(Filed Jan, 2, 1990)

On May 19, 1989, Kansas filed a Second Motion to Amend Complaint and to Bifurcate Proceedings. The proposed amendment to the Complaint has been ruled upon, but not the bifurcation motion. Kansas urged in its motion that "[A]ll proceedings relating to damages or compensation" be severed and reserved for subsequent proceedings after a final decision on liability. Colorado initially opposed the motion, arguing that the issues of liability and damages were so intertwined in this case that they could not be separated and still satisfy the criteria of Rule 42(b). Colorado was especially concerned that the bifurcation sought by Kansas might prejudice its ability to present evidence in support of its counterclaim and affirmative defenses of laches, estoppel, waiver and unclean hands.

At the hearing on November 6, 1989, the Special Master assured Colorado that no bifurcation of issues would impair Colorado's ability to present its affirmative defenses or counterclaim as part of the liability phase of

the trial. Subject to that condition, however, the Special Master outlined certain advantages of severing the entire remedy phase of the trial, including any monetary damages and expert testimony thereon, until the liability issue has been decided and the amounts of shortage, if any, have been determined.

After further discussion, counsel for Kansas stated his general support for such a bifurcation of the remedy phase of the trial. Colorado did not disagree, but continued to stress its primary concern that any bifurcation order not preclude Colorado from presenting "economic testimony" during the liability phase of the trial. Record of November 6, 1989, at 88. Counsel for Colorado explained that he wanted the ability, as part of any consideration of liability, to address the relationship between water use practices in both states and the economics of those practices, in order to assist in explaining why certain things were done and why certain changes occurred. The United States was not present at the November 6 hearing, but previously had stated that it took no position on the Kansas motion to bifurcate.

The underlying issue in this case is whether the State of Colorado and its water users, in violation of the Compact, have caused a material depletion in the usable quantities or availability of the waters of the Arkansas River for use by the water users in Kansas. If Kansas fails to show such a violation of the Compact, then of course it has no grounds for relief. Assuming, however, that liability is established, the remedy phase of the trial then promises to be complex and possibly quite lengthy. Kansas seeks both injunctive relief and damages. It has also indicated that it may propose the replacement of native

Arkansas River water with currently unused transmountain water. Moreover, the recent settlement in *Texas v. New Mexico* has left unresolved major issues over the way in which any monetary damages may be computed. The Special Master believes that these various remedy issues can best be addressed after liability has been determined, and any water shortages to Kansas have first been quantified.

Accordingly, and pursuant to Rule 42(b), the trial of this case will be bifurcated into a liability and a remedy phase, provided that the State of Colorado shall not be limited during the liability phase from introducing such economic or other evidence or testimony related to any damage that may be necessary to its defense on the issue of liability, or in support of its affirmative defenses or counterclaims. *See Texas v. New Mexico*, 446 U.S. 540 (1980); 462 U.S. 554 (1983); and 482 U.S. 124 (1987); *Smith v. Alyeska Pipeline Serv. Co.*, 538 F.Supp. 977 (D. Del. 1982); *Gasoline Products Co. v. Champlin Refining Co.* 283 U.S. 494, 500 (1931).

DATED: January 2, 1990

/s/ Arthur L. Littleworth
Arthur L. Littleworth
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business address is Best, Best & Krieger, 400 Mission Square, 3750 University Avenue, Riverside, California 92502.

I am readily familiar with Best, Best & Krieger's practice for collecting and processing correspondence for mailing with the United States Postal Service. Under that practice, all correspondence is deposited with the United States Postal Service the same day it is collected and processed in the ordinary course of business.

On January 2, 1990, I served the within ORDER RE KANSAS MOTION TO BIFURCATE PROCEEDINGS, by placing a copy of the document in a separate envelope for each addressee named below and addressed to each such addressee as follows:

Richard A. Simms, Esq.
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First Northern Plaza, Suite A
121 Sandoval Street
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David W. Robbins, Esq.
Hill & Robbins
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Patricia Weiss, Esq.
U.S. Department of Justice
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Andrew F. Walch, Esq.
U.S. Department of Justice
Land & Natural Resources Division
U.S. Federal Building
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P.O. Drawer 3607
Denver, Colorado 80202

On January 2, 1990, at the office of Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502, I sealed and placed each envelope for collection and deposit by Best, Best & Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on January 2, 1990, at Riverside, California.

/s/ Sandra L. Simmons
Sandra L. Simmons

APPENDIX – Exhibit 7

Order re Pre-Trial Discovery and Procedures,
filed March 7, 1990; Order Amending Order
re Pre-Trial Discovery and Procedures, filed May 25, 1990

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS,	)	
Plaintiff,	)	No. 105, Original
	)	October Term,
v.	)	1985
STATE OF COLORADO,	)	
	)	
Defendant.	)	
	)	

ORDER RE PRE-TRIAL DISCOVERY AND PROCEDURES
(Filed Mar. 7, 1990)

This Order is intended to govern the discovery procedures for expert witnesses and certain other pre-trial issues. Additional pre-trial orders may still be required. This Order arises from a Pre-trial Conference held on February 16, 1990 before the Honorable Arthur L. Littleworth, Special Master. Appearing at the conference on behalf of Petitioner, State of Kansas, were Richard A. Simms, Esq. and John B. Draper, Esq. Appearing on behalf of Respondent, State of Colorado, were David W. Robbins, Esq. and Dennis M. Montgomery, Esq. Appearing on behalf of Intervenor, United States of America, was David Shuey, Esq. This Order has been prepared after extensive discussion with counsel and after consideration by the Special Master of proposed draft pre-trial orders prepared, respectively, by counsel for the State of Colorado and counsel for the State of Kansas. Based upon that discussion and review,

IT IS HEREBY ORDERED as follows:

I.

STATEMENTS OF ENTITLEMENT UNDER THE PROVISIONS OF THE COMPACT

For the purpose of furthering the Special Master's understanding of the issues and positions of the parties in this case, and in response to certain discovery issues, Kansas and Colorado by April 2, 1990 shall each file and serve on the other parties a statement setting forth their respective views on the entitlements of each State under the Arkansas River Compact to receive or use the waters of the Arkansas River. These statements shall be complete and shall take into account all provisions of the Compact. The United States may, but is not required to, also submit its views on the subject.

II.

DESIGNATION OF ADDITIONAL EXPERT WITNESSES BY THE STATE OF KANSAS

By motion filed February 15, 1990, the State of Kansas sought leave of the Special Master to designate five additional expert witnesses. That motion is hereby granted. Colorado indicated at the Pre-trial Conference that it did not intend to designate any additional experts. It is understood that the expert identifications required and made on January 15, 1990, together with the additional designations authorized hereby, do not include any experts required in any damage phase of the trial. Nor does this Order cover any rebuttal witnesses or exhibits.

III.

STATEMENT OF THE FACTS AND OPINIONS OF KANSAS' EXPERTS

Not later than Monday, April 2, 1990, the State of Kansas shall provide a statement of the substance of the facts and opinions to which its experts are expected to testify and a summary of the grounds for each opinion stated, as required by Rule 26(b)(4)(A)(i).

IV.

SCHEDULE FOR DEPOSITIONS FOR KANSAS' EXPERTS BY COLORADO AND THE UNITED STATES

The State of Colorado and the United States of America will be permitted to begin discovery of Kansas' experts by deposition and by subpoena *duces tecum* on Friday, April 6, 1990. Colorado and the United States shall have a right to depose Kansas' experts for a period of two months concluding Wednesday, June 6, 1990. Depositions of the experts for Colorado and United States will follow as provided in Section VI hereof. The following rules, *inter alia*, shall apply to these depositions:

A. The parties have indicated that they will cooperate in the scheduling of individual depositions of expert witnesses, and no additional orders in that regard are now required.

B. No subpoenas will be necessary to ensure that identified witnesses appear at and bring documents to depositions, except for witnesses who will not appear voluntarily and over whom the parties have no control.

Listing the documents requested on the notice of deposition will be sufficient.

C. If it develops in the course of any deposition that an expert has relied upon material not in possession of the deposing party, such material shall be provided promptly to all parties.

D. During the two-month period of time, other discovery by any party (except for depositions of Colorado's and United States' experts) shall not be precluded, provided and to the extent such discovery does not interfere with the deposition of Kansas' experts by Colorado and the United States.

E. The scope of authorized discovery, both as to depositions and the production of documents, of the expert witnesses designated by the State of Kansas shall encompass the following:

1. All instructions to the expert, not otherwise privileged, relating to the scope of his or her assignment, including all documents relating thereto;

2. All data, documents, interview notes or other material relied upon or reviewed by the expert in preparing for testimony; provided that material reviewed but not relied upon need not be produced except upon special showing.

3. All notes, records, draft reports, preliminary reports, or other preliminary materials prepared by a designated expert witness; provided that the production of draft or preliminary material shall not be required unless the expert

has changed any opinion expressed therein, or upon other special showing.

4. All final reports, exhibits, charts, graphs, tables or other materials prepared by the expert.

F. Based upon the representations of counsel, the Special Master understands that for budgetary reasons experts for the State of Kansas have not prepared final reports which set forth their opinions and the grounds therefor. The Special Master expects, however, that the State of Kansas will endeavor to organize whatever written documents have been prepared by its experts in a way that will expedite discovery by Colorado and the United States. Should the absence of final reports for Kansas' experts unduly delay discovery by Colorado and the United States, the Special Master will reconsider the time required for expert discovery.

G. Expert depositions by Colorado and the United States shall proceed, insofar as practical, without interruption. If such depositions can be completed in less than the allotted two months, this shall be done. In such event the two months allowed for expert depositions by Kansas shall be advanced from the June 8 commencement date set in Section VI hereof. Likewise, the statements required of Colorado and the United States in Section V shall be provided at least four days before Kansas begins.

H. The resolution of any discovery disputes arising during depositions shall be undertaken at the time of the

deposition, by telephone to the Special Master, or as soon thereafter as is possible.

V.

STATEMENT OF FACTS AND OPINIONS OF COLORADO AND UNITED STATES EXPERTS

Not later than Monday, June 4, 1990, the State of Colorado and the United States shall each provide a statement of the substance of the facts and opinions to which their expert witnesses are expected to testify and the summary of the grounds for each opinion stated, as required by Rule 26(b)(4)(A)(i).

VI.

SCHEDULE FOR DEPOSITIONS FOR COLORADO'S AND UNITED STATES' EXPERTS BY KANSAS

The State of Kansas will be permitted to begin discovery of Colorado's and United States' experts by deposition and by subpoena *duces tecum* on Friday, June 8, 1990. Kansas shall have a right to depose Colorado's and the United States' expert witnesses for a period of two months concluding Wednesday, August 8, 1990. Corresponding rules to those set forth in Sections IV A, B, C, D, E and H shall also apply to these depositions by Kansas.

VII.

AGREEMENTS REGARDING DEPOSITIONS OF EXPERTS, INCLUDING FEES AND EXPENSES

Discovery of experts by deposition shall be precluded except as provided herein or as agreed to by the

parties. Each party shall pay the expert fees and expenses to depose another party's expert witnesses; provided, however, that such fees and expenses shall be limited to the time actually spent in deposition and the reasonable expenses of travel, hotel and meals if the deposition is scheduled at a location other than where the expert witness resides or has his or her principal place of business. The parties agree that depositions of all experts may be taken in Denver, Colorado, and that the party electing to take the deposition of an expert who does not reside or have his or her principal place of business in Denver, Colorado, shall pay the travel expenses of such expert, including airfare and reasonable expenses for hotel and meals during the deposition, in order to take such depositions in Denver, Colorado. The attorneys agree to make the expert witnesses identified by the party they represent available for deposition in accordance with his schedule. In the event any expert is not available to be deposed in accordance with the schedule provided for in this Order for any reason, the parties shall attempt to agree on alternative dates for such deposition, and a modification of the schedule herein. If the parties cannot agree, the party desiring to take the deposition may apply to the Special Master to schedule the deposition and to make such modification as the Special Master deems fair and just under the circumstances.

VIII.

DISCLOSURE OF NON-EXPERT WITNESSES BY COLORADO

By Friday, June 15, 1990 the State of Colorado shall identify all of its non-expert witnesses who are expected

to testify at trial, including their addresses and telephone numbers, together with a summary of testimony of each such witness.

IX.

PRE-TRIAL STATEMENTS

On or before Wednesday, August 15, 1990, the parties shall file pre-trial statements setting forth any stipulations concerning joint exhibits, any admissions of fact, data or documents, a statement of disputed issues of fact and law, and a list of exhibits which may be offered at trial. In addition, the pre-trial statements of Kansas and the United States shall identify all of their non-expert witnesses who are expected to testify at trial, including their addresses and telephone numbers, together with a summary of the testimony of each such witness.

By Wednesday, August 29, 1990, the parties may petition the Special Master for leave to add the name of any additional non-expert witness who could not reasonably have been anticipated to be required as a witness until after the initial identification of non-expert witnesses by others, and for leave to add any additional exhibits which could not reasonably have been anticipated to be required until after the initial designation of exhibits by others. Thereafter, additional exhibits may not be endorsed or offered, except for impeachment or rebuttal exhibits, with the following limited exception: a party may petition the Special Master to admit additional exhibits or testimony whose existence was not known or could not have been foreseen or on the grounds that the ends of justice require, and the Special Master may admit

such exhibits or testimony at his discretion, but only on such conditions as the Special Master deems just under the circumstances and which can be permitted without undue prejudice to other parties.

X.

EXCHANGE OF COPIES OF EXHIBITS; OBJECTIONS TO AUTHENTICITY OF EXHIBITS

Except for any joint exhibits to which the parties may have agreed, the parties shall provide copies of all exhibits to other parties by Wednesday, August 15, 1990, unless photocopying is impractical because of the size or unusual length of the exhibit, in which case the exhibit shall be made available for inspection in Denver, Colorado. The authenticity of all documents designated as exhibits shall be deemed admitted unless a party files a written statement by August 29, 1990, identifying the specific documents, the authenticity of which are not admitted.

XI.

DATES FOR FILING PRE-TRIAL MOTIONS

All pre-trial motions shall be filed no later than August 15, 1990.

XII.

CUT-OFF DATE FOR ALL DISCOVERY

To enable the parties to prepare for trial, no discovery shall be conducted or required after August 8, 1990,

except for non-expert witness depositions which may be taken until August 31, 1990.

XIII.

TRIAL DATE

To permit full and fair discovery by all parties, and at the request of both States, the trial date now set for July 16, 1990 will be vacated and the trial date reset to commence Monday, September 17, 1990.

XIV.

This Order may be amended for good cause shown.

DATED: March 7, 1990.

/s/ Arthur L. Littleworth
Arthur L. Littleworth
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business address is Best, Best & Krieger, 400 Mission Square, 3750 University Avenue, Riverside, California 92502.

I am readily familiar with Best, Best & Krieger's practice for collecting and processing correspondence for mailing with the United States Postal Service. Under that practice, all correspondence is deposited with the United States Postal Service the same day it is collected and processed in the ordinary course of business.

On March 7, 1990, I served the within ORDER RE PRE-TRIAL DISCOVERY AND PROCEDURES by placing a copy of the document in a separate envelope for each addressee named below and addressed to each such addressee as follows:

Richard A. Simms, Esq.
Simms & Stein
First Northern Plaza, Suite A
121 Sandoval Street
Santa Fe, New Mexico 87501

David W. Robbins, Esq.
Hill & Robbins
100 Blake Street Building
1441 Eighteenth Street
Denver, Colorado 80202

Patricia Weiss, Esq.
U.S. Department of Justice
Land & Natural Resources Division
General Litigation Section
P.O. Box 663
Benjamin Franklin Station
Washington, D.C. 20044-0663

Andrew F. Walch, Esq.
U.S. Department of Justice
Land & Natural Resources Division
U.S. Federal Building
1961 Stout Street, #690
P.O. Drawer 3607
Denver, Colorado 80202

On March 7, 1990, at the office of Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502, I sealed and placed each envelope for collection and deposit by Best, Best & Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on March 7, 1990, at Riverside, California.

/s/ Sandra L. Simmons
Sandra L. Simmons

STATE OF KANSAS, Petitioner, v. STATE OF COLORADO, Respondent.	))))))))	No. 105, Original United States Supreme Court October Term, 1985

ORDER AMENDING ORDER RE PRE-TRIAL DISCOVERY AND PROCEDURES

(Filed May 25, 1990)

By motion, the State of Colorado seeks: (1) an extension of one week in the period of time provided for its discovery of Kansas' expert witnesses by the Order re Pre-Trial Discovery and Procedures filed March 7, 1990; (2) a one week extension of the date for it and the United States to provide a statement of the substance of the facts and opinions to which their expert witnesses are expected to testify; and (3) a delay of one week of the date upon which Kansas may begin depositions of Colorado's and the United States' experts. The State of Kansas, by letter addressed to the Special Master, has indicated that it does not oppose the requested extension of Colorado's discovery period.

Good cause appearing therefore,

Colorado's motion to extend the period in which it may depose expert witnesses of the State of Kansas by one week is hereby granted. Paragraph IV of the Order re Pre-Trial Discovery and Procedures heretofore filed on March 7, 1990 is amended to provide that Colorado and

the United States shall have a right to depose Kansas' experts for a period concluding Wednesday, June 13, 1990. Further, Paragraph V of the Order re Pre-Trial Discovery and Procedures is amended to provide that the State of Colorado and the United States shall have until Monday, June 11, 1990 to provide a statement of the substance of the facts and opinions to which their expert witnesses are expected to testify and the summary of the grounds for each opinion stated. Finally, Paragraph VI of the Order re Pre-Trial Discovery and Procedures is amended to provide that discovery by the State of Kansas of Colorado's and the United States' experts by deposition and by subpoena duces tecum shall commence on Friday, June 15, 1990 and continue for a period of two months concluding Wednesday, August 15, 1990.

/s/ Arthur L. Littleworth
Arthur L. Littleworth
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County of Riverside; I am over the age of eighteen years and not a party to the within entitled action; my business address is Best, Best & Krieger, 400 Mission Square, 3750 University Avenue, Riverside, California 92501.

I am readily familiar with Best, Best & Krieger's practice for collecting and processing correspondence for mailing with the United States Postal Service. Under that practice, all correspondence is deposited with the United States Postal Service the same day it is collected and processed in the ordinary course of business.

On May 25, 1990, I served the within ORDER AMENDING ORDER RE PRE-TRIAL ORDER DISCOVERY AND PROCEDURES by placing a copy of the document in a separate envelope for each addressee named below and addressed to each such addressee as follows:

Richard A. Simms, Esq.
Simms & Stein
First Northern Plaza, Suite A
121 Sandoval Street
Santa Fe, New Mexico 87501

David W. Robbins, Esq.
Hill & Robbins
100 Blake Street Building
1441 Eighteenth Street
Denver, Colorado 80202

Patricia Weiss, Esq.
U.S. Department of Justice
Land & Natural Resources Division
General Litigation Section
P. O. Box 663
Benjamin Franklin Station
Washington, D.C. 20044-0663

Andrew F. Walch, Esq.
U.S. Department of Justice
Land & Natural Resources Division
U.S. Federal Building
1961 Stout Street, #690
P. O. Drawer 3607
Denver, Colorado 80202

On May 25, 1990, at the office of Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92501, I sealed and placed each envelope for collection and deposit by Best, Best & Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct and that this Proof of Service is executed on this 25th day of May, 1990 at Riverside, California.

/s/ Linda Hutton
Linda Hutton

APPENDIX – Exhibit 8

Order re Kansas Motion for Continuance,
filed March 27, 1991

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant.	)	No. 105, Original October Term, 1985

ORDER RE KANSAS MOTION FOR CONTINUANCE

(Filed Mar. 27, 1991)

The trial in this case began on September 17, 1990. While counsel for all parties originally estimated that the first phase[1] of the trial would require between two and three months, Kansas still had not completed its case when the trial was temporarily recessed on February 20, 1991, after some 57 trial days.

The first Kansas witness was Dr. Douglas R. Littlefield, an historian, who testified extensively on the events leading up to the 1949 Arkansas River Compact, and on the negotiation of the Compact itself. His testimony and cross-examination extended over 11 trial days, from September 18 to October 16, 1990. He provided support for the Kansas position concerning the intent of the Compact, Kansas' entitlement thereunder, and the Colorado obligations.

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[1] The trial was bifurcated by Order dated January 2, 1990. The first phase relates to liability only. If liability is established, then the trial will resume for the remedy phase, including damages.

Kansas then followed with a number of witnesses, primarily experts, who presented evidence on what has occurred since the Compact was approved in 1949. Much of this evidence consisted of basic hydrologic and land use data that was also used in the development of the Kansas "hydrologic-institutional" computer model. Although Colorado has yet to begin its case, it is clear from the pretrial statements and from cross-examination that much of this voluminous basic information is in dispute.

For example, post-Compact groundwater pumping in Colorado, and its impact on the flows of the Arkansas River reaching Kansas, certainly constitute major issues in this case. Yet there are no official records that fully detail the large number of wells that have been drilled since 1949, nor the amounts of water that have been pumped over the years. Groundwater production must be estimated through the use of utility records for those wells equipped with electric motors, but a sizable number of wells are fueled with natural gas, for which no comparable utility records are available. Records are also lacking on the number of acres irrigated and the kinds of crops grown. The crop mixture, of course, affects the amount of water used. Agricultural usage must therefore be pieced together from various records, surveys, and aerial photographs. Streamflow records are also incomplete. While flows of the Arkansas River are gauged at numerous points, and those measurements do not seem to be in dispute, many of the tributaries are not gauged at all, and others have only incomplete records. The patterns of historic flows in the Arkansas River have also been altered by the operation of three large reservoirs in

Colorado. Moreover, in recent years, large amounts of water from the western slopes of the Rocky Mountains, to which Kansas claims no rights, have been imported to augment the Arkansas River Basin supplies in Colorado.

These are not the only areas of important factual dispute, but they serve to illustrate the complexity of determining the impact of changes that have occurred since 1949, and whether such changes constitute one or more violations of the Arkansas River Compact.

The chief technical expert for the State of Kansas has been Timothy J. Durbin. He began his work for Kansas in 1985, investigating various possible causes for the depletion of flows in the Arkansas River at the Colorado-Kansas state line. He took the stand on January 14, 1991. In the vernacular of the baseball season, he was Kansas' cleanup hitter. He took much of the evidence introduced by earlier Kansas expert witnesses, blended it into his own investigation, and reached specific conclusions about the causes of depletion in stateline flows. His conclusions were derived from three separate approaches: a statistical analysis, a water budget analysis, and the results of a complex hydrologic-institutional model of the Arkansas River Basin. Only through the model, however, did he allocate specific amounts of depletion to specific causes. For example, he prepared a summary matrix (Kansas Exhibits 111* and 112*) that showed what the stateline flows would have been in the absence of post-compact well pumping in Colorado, and separately, the amount of reduction in stateline flows caused by the winter water storage program in Colorado. Kansas maintains that both of these constitute Compact violations. Mr.

Durbin completed his testimony on January 24, 1991, and cross-examination by Colorado began on the same day.

During cross-examination, a number of mistakes were uncovered in certain Kansas exhibits. Some were merely plotting errors, e.g., discrepancies between actual tabulated data and the graphs or summaries portraying those data on display exhibits. Some errors, however, were more substantive, and some affected the program coding instructions used in the model. Kansas began to respond by overnight preparation of revised exhibits.[2] Mr. Durbin had the responsibility of explaining the revisions, but in some instances a second or third revision was offered even before there had been any opportunity to testify on the first. Errors in coding or handling data in the model presented even more difficulties. Mr. Durbin stated that more time would be required for these analyses and changes.[3] It was finally agreed that Mr. Durbin would be withdrawn from the stand and given time to correct the errors in the model and other Kansas exhibits, as might be appropriate, and then would return for additional examination at a time to be worked out. (Rep. Tr., LIV, Feb. 14, p. 101)

Kansas then called as its next witness Dr. Lawrence J. Lefkoff, who had assisted Mr. Durbin and had direct

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[2] For example, on January 28 Kansas offered 13 revised exhibits, and the next day produced another 10.

[3] Colorado indicated that the error with respect to the winter water storage program had a major impact. It claimed that when monthly flows were properly adjusted, the result would show that the winter water storage program had no adverse effect on stateline flows, thus eliminating one of Kansas' claims.

responsibility for certain aspects of the model. His direct testimony, apart from that related to revisions of the model, was completed on February 15.

The trial resumed on February 19. At the outset, Mr. Simms, counsel for Kansas, reported in chambers that Mr. Durbin had been admitted over the weekend to a psychiatric hospital with severe depression. At that time, Mr. Simms had not been able to contact Mr. Durbin's physician directly, and he had little additional information. The trial proceeded with the cross-examination of Dr. Lefkoff, while Mr. Simms attempted to learn more.

On the next day, February 20, an extensive conference was held in chambers, and summary statements were then made to the court reporter. That transcript was ordered sealed, except as it was necessary for counsel to advise their parties of what had occurred and the reasons for delay. Essentially, however, counsel for Kansas indicated that Mr. Durbin would not be able to work on the case for at least three months, and perhaps would not be able to return at all. Colorado requested that the services of an independent Board-certified psychiatrist be secured to review Mr. Durbin's situation and then report to the Master. Colorado stated that it would pay for the cost of such an examination and report. Colorado also argued that any extended postponement in the trial was unnecessary and would be highly prejudicial to Colorado, no matter what Mr. Durbin's future condition might be. At the conclusion of that session, Kansas was ordered to file a written motion for continuance by March 1, Colorado's request for an independent medical opinion was approved, and at the close of the day the trial was

recessed until further order. At that time, Dr. Lefkoff's cross-examination was not completed.

Kansas' written motion seeks a continuance of seven months. It is based upon a brief affidavit from Jean A. Warren, M.D., Mr. Durbin's attending psychiatrist, stating that he is suffering from a major depression; that three months will be required for treatment and convalescence; and that he would then most likely be able to return to his customary work, but there is no guarantee of that fact. The Kansas motion states that it intends to expand the roles of several expert witnesses already involved in the case in order to fill the void created by Mr. Durbin's illness. The principal replacement appears to be Steven P. Larson. His affidavit states that three months would be required "to come up to Mr. Durbin's level of knowledge," and because of prior commitments in a number of other cases, a minimum of seven months would be required for him to be able to testify here.

Colorado filed a response, objecting to such a lengthy continuance, and indicating that if this were ordered the case would actually have to go over for at least a year. Colorado's chief counsel is scheduled to try another major water case in October, 1991, and a number of the expert witnesses here are also involved in that case. Colorado had reported this commitment early on, but under the original scheduling of this case, there did not appear to be any conflict.

Colorado is skeptical about the need for any lengthy delay. It argues that the Kansas case is almost complete, and that the expected revisions in programming the model can be done by Dr. Lefkoff. Indeed, Mr. Durbin

testified that most of the problems were being analyzed by Dr. Lefkoff and necessary coding changes were being made by him.[4] However, there were parts of Mr. Durbin's testimony that were also under revision (including the statistical and water budget analyses), and Dr. Lefkoff had not participated in that work.

In its motion, Kansas also argued that Mr. Durbin would be needed to assist Kansas counsel in the cross-examination of Colorado experts on phreatophytes and pumping estimates, as well as on modeling. (Motion, p. 3) Colorado properly points out, however, that Dr. Groeneveld and Mr. Book, respectively, were the Kansas experts on phreatophytes and groundwater pumping. (Colorado Response, p. 15) Mr. Durbin was not listed as a witness on either of these subjects, nor on basic data. In fact, most of the basic data used in the Kansas hydrologic-institutional model came to Mr. Durbin from other Kansas experts.

With the consent of Dr. Warren, I did arrange for a second opinion from a Board-certified psychiatrist, Dr. Robert M. Bittle. He examined Mr. Durbin on March 2,

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[4] Mr. Durbin testified that Dr. Lefkoff was doing the work associated with program changes on the winter water storage program, and in the distribution of recharge in irrigated areas. (Rep. Tr., LIII, February 13, pp.8-10) Moreover, Mr. Durbin identified a number of other problem areas that were being reviewed by Dr. Lefkoff and that would probably require corrections by him: use of native flows in District 67, transit losses, "want factors" for the Buffalo Canal, Kansas calls for water, storage of Amity water in John Martin Reservoir, off-channel storage when two storage rights are involved, and negative streamflows. (Rep. Tr., LIII, February 13, pp. 9, 10, 78, 80, 82-85)

1991, in his office for approximately three hours. This was the day that Mr. Durbin was released from Heritage Oaks, a psychiatric hospital in Sacramento. He had been admitted on February 16. Dr. Bittle also completed certain psychological testing, reviewed the hospital records, and interviewed Mrs. Durbin.

On March 8, I received an 18-page single-spaced report from Dr. Bittle. It was extremely comprehensive and included much information that I felt should be kept confidential. I did not forward a copy of this report to counsel, but I did promptly mail them a copy of his recommendations. Dr. Bittle's diagnosis was: "Major depressive illness, recurrent, without psychotic features, in partial remission." He felt that in approximately four weeks Mr. Durbin would be able to resume his trial duties. He informed me that Mr. Durbin was in agreement, and wanted to return.

On March 12 I arranged a conference telephone call with all counsel. While not discussing Dr. Bittle's report in detail, I indicated that there was no doubt that Mr. Durbin's condition leading to his hospitalization was indeed serious. Nonetheless, in view of Dr. Bittle's recommendation, I suggested that we return to court on April 8, that we finish what little remained on the Kansas case (except for the various exhibit and model revisions still under way), and that Colorado then begin its case, starting with subjects that would not require Mr. Durbin's participation. Colorado and the United States were in general agreement with this suggestion, but Kansas asked that I hold my decision until its reply brief had been received.

The Kansas reply brief included an additional affidavit from Dr. Warren, and two separate affidavits from church counselors who indicated that they had been counseling Mr. Durbin and his family since 1986. Each of these affiants disagreed with Dr. Bittle. Moreover, the two counselors indicated that they had spoken recently with Mr. Durbin and that he did not believe he would be ready to return to the trial within a month. I called Dr. Bittle and relayed these additional opinions to him. He said that he wanted to talk again with Mr. Durbin and that he would get back to me as soon as possible.

Dr. Bittle called on March 19. In substance, he reported that Mr. Durbin appeared to be a different person from the man he had seen just after his release from the hospital, that Mr. Durbin no longer believes that he can participate, and, without discussing the reasons here, that Dr. Bittle agrees. A confirming letter has also been received from Dr. Bittle. From my conversations with Dr. Bittle, and my review of all of the medical reports, I have concluded that Mr. Durbin should not be pressured into returning, and that we must assume that he will not be able to resume his trial responsibilities soon, if at all.

Colorado argues, nonetheless, that Dr. Lefkoff should be able to replace Mr. Durbin since they "were jointly listed as expected to testify to the same facts and opinions." (Response, p. 11) It was clear, however, from the depositions and from the Kansas direct testimony that Dr. Lefkoff's responsibilities were much more limited than those of Mr. Durbin. His model responsibilities were confined to the development of the administrative and land modules of the overall model, and running the model to calculate stateline depletions. (Rep. Tr., LIV, Feb. 14, at p.

112) Most of the work done in relation to the precipitation-runoff modeling, and the groundwater modeling, was done prior to Dr. Lefkoff's employment. (Dr. Lefkoff deposition, May 15, 1990, at pp. 10-11) Nor did he have responsibilities for the statistical and water budget analyses presented by Mr. Durbin, and for which possible revisions are still pending. But perhaps of overriding importance is the fact that Mr. Durbin was Kansas' "principal expert in the critical area of hydrology," and Kansas should be entitled to select a replacement expert, if that is necessary, of equal experience and stature. (Kansas Reply, p. 23) While Kansas indicates that Dr. Lefkoff's role will be expanded, as will that of Spronk Water Engineers, Kansas has asked Steven P. Larson of S. S. Papadapulos to be the primary replacement for Mr. Durbin. It is his schedule that drives the motion for a seven month continuance.

Both States acknowledge that the granting of a continuance during trial lies within the sound discretion of the trial court. (Kansas Brief, pp. 2-3; Colorado Response, p. 9; *Johnston v. Harris County Flood Control District*, 869 F.2d 1565, 1570 (CA 5 1989); *Harmon v. Grande Tire Co., Inc.*, 821 F.2d 252, 256 (CA 5 1987)) Moreover, Special Masters have broad discretion in procedural matters relating to the receipt of evidence and the order of witnesses. The Federal Rules of Civil Procedure are advisory only. (Sup.Ct.Rule 17.2; see *California v. Southern Pacific Co.*, 157 U.S. 229, 249 (1895); *Ohio v. Kentucky*, 410 U.S. 641, 644 (1973))

In view of Mr. Durbin's unique role in the development and presentation of the Kansas case, and the important sovereign interests that are involved in this case, the

completion of the Kansas case on direct, and any rebuttal evidence, will be continued until either Mr. Durbin is able to resume the stand, or his replacement or replacements are prepared and available.[5] I will determine later the specific time for resuming this part of the trial, but such scheduling will not interfere with Mr. Robbins' prior trial commitment in October of this year. Nor should the delay otherwise be longer than is actually necessary.

This continuance is not granted to allow Kansas, as Colorado fears, "to redo its case." (Colo. Response, p. 9) Rather, it is intended only to allow Kansas to complete its case, and in particular, to remedy the errors in the model and other exhibits that were identified during cross-examination. Colorado suggests that this task should not be large, but having to defend revisions on the stand may invoke even more intense cross-examination than occurred originally. Kansas is relying upon the testimony of Mr. Durbin, or his replacement, to quantify the shortage in stateline flows, and to allocate the shortage among specific causes. No witness who carries this burden can afford to testify with less than full preparation.

The Kansas motion would also suspend the beginning of the Colorado case in chief. Kansas argues that it must have adequate expert assistance in order to evaluate the expert testimony and exhibits presented by Colorado. It says that "full access to expert assistance in the . . . defense of its case" is a fundamental due process

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[5] Dr. Danielson is an exception. He is Colorado's principal water official and is being called by Kansas as an adverse witness. He will be fitted in during the Colorado case as his schedule permits.

right, citing *Ake v. Oklahoma*, 470 U.S. 68 (1985). (Kansas Brief, p. 5) Mr. Durbin is said to be the person who was intended to fill that role. Kansas contends that effective cross-examination of the opposing party's expert may require a continuance, citing *Anzaldo v. Croes*, 478 F.2d 446 (CA 8 1973); *Nutt v. Black Hills Stage Lines*, 452 F.2d 480 (CA 8 1971); *Smith v. Massachusetts Institute of Technology*, 877 F.2d 1106, 1110-1112 (CA 1 1989).

Certain issues, however, have nothing to do with Mr. Durbin's assignments, e.g., the Compact negotiations and its meaning, the operations of the Trinidad Reservoir, and the administration of water rights in both Kansas and Colorado. Even in the areas of hydrology and land use, Kansas presented much of its evidence through other experts. Dr. Groeneveld was its witness on the use of water by phreatophytes. Spronk Water Engineers provided the basic data on groundwater pumping, irrigated acreage, water use, and streamflow measurements. Testimony on geology and groundwater movement came from John W. Shomaker. Thus, the Kansas interests on many issues can be fully protected through the assistance of its other experts, and the presence of Mr. Durbin, or his replacement, while perhaps useful, does not seem to be essential in these areas.

Colorado is prepared and has been waiting to begin its case. It does not want it to be further postponed. The prejudice resulting from a lengthy delay is obvious. Voluminous amounts of detailed information have been analyzed, assembled and absorbed by the expert witnesses for this case, but that kind of preparation cannot be kept in mind over time. I too would like to see the

Colorado basic case while the Kansas evidence is still fresh.

There can be little doubt that Kansas did intend to rely on Mr. Durbin for help with Colorado's modeling efforts. Yet even in this area, Kansas is not wholly without resources. Depositions were taken. Computer programs and data were exchanged. And, of course, Dr. Lefkoff is still available. Any substantial prejudice to Kansas can be avoided by reserving its right of cross-examination with respect to Colorado's modeling evidence.

Accordingly, it is hereby ordered that the trial resume on April 9 at 9:30 a.m. in Courtroom Three of the Court of Appeals Courthouse in Pasadena with the completion of Dr. Lefkoff's cross-examination, apart from the results of any revisions to the Kansas modeling evidence. Colorado will then begin the presentation of its case. Kansas will have the right to reserve all or part of its cross-examination with respect to Colorado's modeling testimony, and to complete such cross-examination when appropriate expert assistance becomes available, or when Kansas completes its case. In addition, the order of Colorado witnesses shall be arranged, to the extent feasible, to permit Mr. Spronk to be present on subjects within his expertise. In view of Mr. Durbin's absence, Mr. Spronk's attendance assumes greater importance, but his affidavit identifies certain difficult scheduling conflicts. If these

conflicts cannot be avoided, then Kansas' cross-examination may also be reserved on these witnesses until Mr. Spronk can be present or Kansas completes its case.

DATED: March 27, 1991

/s/ Arthur L. Littleworth
Arthur L. Littleworth,
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business address is Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502.

I am readily familiar with Best, Best & Krieger's practice for collecting and processing correspondence for mailing with the United States Postal Service. Under that practice, all correspondence is deposited with the United States Postal Service the same day it is collected and processed in the ordinary course of business.

On March 27, 1991, I served the within **ORDER RE KANSAS MOTION FOR CONTINUANCE** by placing a copy of the document in a separate envelope for each addressee named below and addressed to each such addressee as follows:

Richard A. Simms, Esq.
Simms & Stein
First Northern Plaza, Suite A
121 Sandoval Street
Santa Fe, New Mexico 87501

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U.S. Department of Justice
Land & Natural Resources Division
General Litigation Section
P.O. Box 663
Benjamin Franklin Station
Washington, D.C. 20044-0663

Andrew F. Walch, Esq.
U.S. Department of Justice
Land & Natural Resources Division
U.S. Federal Building
1961 Stout Street, #690
P.O. Drawer 3607
Denver, Colorado 80202

On March 27, 1991, at the office of Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502, I sealed and placed each envelope for collection and deposit by Best, Best & Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on March 27, 1991, at Riverside, California.

/s/ Sandra L. Simmons
Sandra L. Simmons

APPENDIX – Exhibit 9

Order re Admissibility of Dr. Dracup Notes
(Kan. Exh. 746), filed February 9, 1993

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant, UNITED STATES OF AMERICA, Intervenor.	)	No. 105 Original October Term, 1985

ORDER RE ADMISSIBILITY OF DR. DRACUP NOTES (KANSAS EXH. 746)

(Filed Feb. 9, 1993)

On September 8, 1992, in accordance with applicable procedures, the United States filed a summary of the proposed testimony of Dr. John A. Dracup, a UCLA engineering professor, to be called as a surrebuttal witness. Dr. Dracup had not testified during the United States' case in chief. Nor had he been designated earlier as a possible expert witness for the United States. On September 21, 1992 Kansas moved to exclude the proposed testimony on several grounds. The Kansas motion was denied, but subject to Kansas' right to take Dr. Dracup's deposition before the surrebuttal phase of the trial commenced.

Pursuant to a deposition notice and subpoena *duces tecum*, Dr. Dracup produced for Kansas certain notes that he had taken during a meeting on July 23, 1992 with two other expert witnesses who had testified earlier for the

United States. These witnesses were Charles W. Binder and Donald J. Finlayson.

That was the first time Dr. Dracup had met with other United States experts. The meeting lasted all day. Its purpose was to give him a technical briefing, and to help him prepare for his up-coming surrebuttal testimony. He was "very anxious about coming up to speed of a three-year court case . . . ." RT Vol. 141 at 76 (Dec. 16, 1992). Dr. Dracup took 25 pages of notes, of which two are the subject of this Order. These two pages of notes were probably taken within the first half hour of the meeting.

After commencement of Dr. Dracup's deposition, but before its completion, the United States unexpectedly announced that it had decided not to call Dr. Dracup as a surrebuttal witness. Nonetheless, Kansas sought to pursue the issue of his notes, claiming that the two pages in question were admissible as an admission, or an inconsistent statement of a witness, or a statement against interest.

Both the United States and Colorado objected strenuously, arguing that the notes involved multiple levels of hearsay and that no proper foundation for their admission had been established. Moreover, they asserted that the material in question was "highly prejudicial" and should not be examined by me, even during argument as to admissibility, unless there were no alternative.[1]

---

[1] In its final brief (page 2) the United States said, "It is difficult to imagine more prejudicial evidence or evidence more lacking in probative value."

Accordingly, the two pages of notes, attached to Dr. Dracup's deposition as Exhibit 1, remained sealed until resumption of trial on December 16, 1992. Messrs. Binder and Finlayson, as well as Dr. Dracup, were examined that day with respect to the hearsay and foundation issues. An expurgated version of Dr. Dracup's deposition was also admitted into evidence, without objection, as Kansas Exhibit 749. The sealed notes were not examined until it became clear that such action was necessary in order to evaluate Kansas' claim that the statements constituted an admission against the United States or an inconsistent declaration of its expert witnesses.

To begin with, I ruled from the bench on December 16 that the notes came within certain hearsay exceptions under Federal Rule 803. Although the United States has asked in its latest brief (filed February 1, 1993, page 3) that I reconsider this ruling, in my judgment it is still correct, and the ruling is hereby confirmed. While Dr. Dracup testified that he had no present recollection of the conversations during this July 23 meeting, it was undisputed that the notes were taken by him at that time. Moreover, this was an important meeting and Dr. Dracup said that he took the notes in order to stay focused, to pay close attention. He stated that the notes were his interpretation of what was being said over perhaps several minutes of time. For "complete details" of that meeting, he testified that he would have to go back to his notes. RT Vol. 141 at 74 (Dec. 16, 1992). Dr. Dracup is a Professor of Engineering and Applied Science at UCLA. Certainly his notes of such an important meeting may be viewed as being reasonably reliable, even if cryptic or if they only synthesize a period of conversation.

The specific portion of the notes in controversy reads:

CO: "We know we are guilty, but it can't be proved with any certainty" [quotation marks in original]

WWSP: Very small, if any effects — lost in the noise.

Kansas offered the two pages of Dracup notes, including the foregoing statements, as its Exhibit 746. Kansas took the position initially that the damaging statement constituted an admission by both the United States and Colorado. Kansas' Letter Brief, Dec. 9, 1992, page 8. Under Federal Rule 801(d)(2), an admission by a party-opponent is not hearsay. The statement of an expert witness can constitute an admission. However, if made by such an expert, the statement must be within the scope of the agency or employment. *Collins v. Wayne Corp.*, 621 Fed.2d 777, 781-782 (CA 5 1980); *Rollins v. Board of Governors*, 761 F.Supp. 939, 941-943 (D. R.I. 1991).

Here, the "CO" in the statement refers to Colorado, and Kansas argued that the entire statement "seems to refer to a quotation of a statement by a Colorado expert, counsel or official." Letter Brief, Dec. 9, 1992, page 8. However, Kansas was unable to present any evidence as to who that person might be. Nor did any witness have an explanation for the quotation marks around part of the statement. Accordingly, I ruled on December 16 that a sufficient foundation had not been laid to utilize the notes as an admission against Colorado, or as a statement inconsistent with the testimony of any Colorado witness. RT Vol. 141 at 61, 67 (Dec. 16, 1992). Nothing in the briefs recently filed compels a change in that ruling.

The remaining unresolved issue, on which the recent briefs have concentrated, is whether Kansas Exhibit 746 constitutes an admission against the United States, or an inconsistent statement by its expert witnesses, or a statement against interest, under Federal Rules of Evidence 801(d)(2), 804(B)(3), or 613. I have concluded that the Dracup notes are not admissible on any of these grounds.

Messrs. Binder and Finlayson both strongly denied making these statements, or anything like them. Assuming, however, that the notes do reflect what was said, the remarks are too ambiguous to constitute an admission by the United States. Looking first to the "guilty" statement, the U.S. experts may simply have been repeating a remark made by a Colorado source. The unusual quotation marks, and the reference to "CO" in the margin would seem to lead to such an inference. Indeed, Kansas has made this very argument. Letter Brief, Dec. 9, 1992, page 8. Under those circumstances, there would be no U.S. admission.

Nor is it clear that the "guilty" remark even refers to the winter water storage program, which was the only issue on which the U.S. experts testified. The "WWSP" statement may well be a separate subject from the "CO" statement. There is no reason to require a coupling of these two statements. Indeed, the text can be read as notes of two independent and unrelated subjects. The United States argues that the notes are in fact inconsistent — that the phrase "Very small, if any effects" does not fit with being "guilty". Kansas says the first statement could refer to Colorado's winter water storage program, rather than its post-compact well pumping, and that presumably the "we" would then include the United States. But

that argument does not really overcome the inconsistency between the two statements.

In short, the "guilty" remark could be an admission of the United States only if it expressed the views of Binder or Finlayson and if it referred to the Winter Water Storage Program. The evidence is simply not strong enough to support these conclusions. Fed. Rules Evid. rule 403.

Insofar as the "WWSP" note is concerned, it appears to reflect a statement by Binder or Finlayson, without the possible inference that they were merely quoting someone else. During the trial, neither of them testified to a specific impact resulting from the Winter Water Storage Program. Their evidence, rather, was directed at the Kansas analysis and conclusions, and the statement that any effect from the program was "lost in the noise" is consistent with their opinions on the Kansas evidence. They repeatedly made the point that the impacts shown by the Kansas model were less than the potential error associated with such analyses. I do not believe that this portion of the Dracup notes reflects any inconsistency with their court testimony, or any admission by the United States. Moreover, the foregoing analysis leaves no room for the suggestion that such a statement would be against the interest of either of these witnesses.

Despite ending the trial with such intense controversy over Kansas Exhibit 746, it may be worth recalling the tremendous body of evidence that has been submitted in this case. Decisions will be made on the basis of all of that evidence.

The offer to admit Kansas Exhibit 746 is hereby denied.

DATE: February 9, 1993

/s/ Arthur L. Littleworth
Arthur L. Littleworth
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business address is Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502.

I am readily familiar with Best, Best & Krieger's practice for collecting and processing correspondence for mailing with the United States Postal Service. Under that practice, all correspondence is deposited with the United States Postal Service the same day it is collected and processed in the ordinary course of business.

On February, 1993, I served the within **ORDER RE ADMISSIBILITY OF DR. DRACUP NOTES (KANSAS EXH. 746)** by placing a copy of the document in a separate envelope for each addressee named below and addressed to each such addressee as follows:

John B. Draper
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Santa Fe, New Mexico 87504-2307

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Andrew F. Walch, Esq.
James J. DuBois, Esq.
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General Litigation Section
999 18th Street, Suite 945
Denver, Colorado 80202

On February 9, 1993, at the office of Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502, I sealed and placed each envelope for collection and deposit by Best, Best & Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on February 9, 1993, at Riverside, California.

/s/ Sandra L. Simmons
Sandra L. Simmons

APPENDIX – Exhibit 10

Arkansas River Compact Administration Resolution Concerning an Operating Plan for John Martin Reservoir, adopted April 24, 1980, as revised May 10, 1984 and December 11, 1984

RESOLUTION
CONCERNING
AN OPERATING PLAN FOR
JOHN MARTIN RESERVOIR

WHEREAS, the Arkansas River Compact Administration, hereinafter referred to as the Administration, recognizes that, because of changes in the regime of the Arkansas River, the present operation of the conservation features of John Martin Reservoir does not result in the most efficient utilization possible of the water under its control;

WHEREAS, the Administration finds that adoption of an operating plan that establishes storage accounts for Kansas, for the ditches of Colorado Water District 67, and for other Colorado ditches as provided herein may result in more efficient utilization of the water under its control; and

WHEREAS, the Administration finds that provisions of the operating plan contained herein are permitted by and in compliance with the Arkansas River Compact, hereinafter referred to as the Compact; and the Rules and Regulations; and the Bylaws adopted by the Administration;

NOW THEREFORE, BE IT RESOLVED that the Administration approves and adopts the following operating plan:

I. Definitions:

A. "Period of winter storage" consists of the period of time commencing on November 1 of each year

and continuing to the first exhaustion of conservation storage during the compact year.

B. "Summer storage season" shall be the period of time commencing at the first exhaustion of conservation storage and continuing to and including the next succeeding October 31.

C. "Inflows" include all the normal accretions into John Martin Reservoir, measured or otherwise, including river flow but not including deliveries into the permanent pool or deliveries of other water as subsequently defined herein.

D. "Conservation storage" is water stored in the conservation pool that, but for the adoption of this resolution, would have comprised of the benefits arising from the construction of John Martin Reservoir.

E. "Other water" for regulation by John Martin Reservoir is water delivered into the accounts established in Section III, herein, and delivered under the authority of pre-Compact Colorado water rights. Deliveries of other water are permitted to gain increased utilization and greater beneficial use.

F. "Compact year" is the water accounting year of the Administration; it commences on November 1 of each year and extends to and includes the next succeeding October 31.

G. Except as provided herein, all words and terms used in this resolution have the meaning prescribed in Compact Article III.

II. Operating Principles:

A. Period of Winter Storage –

All inflows into John Martin Reservoir during a period of winter storage shall accrue to conservation storage. Conservation storage shall be released into the accounts specified in Subsection II D beginning at the first request for release after March 31 of account water by a Colorado Water District 67 ditch or by Kansas or beginning at 8:00 a.m. on April 7, whichever occurs first.

B. Summer Storage Season –

(1) When a runoff event occurs during the summer storage season, such that inflows into John Martin Reservoir are expected to exceed then existing irrigation requirements of the ditches in Colorado Water District 67 by at least 1,000 acre-feet, then the gates on John Martin Reservoir shall be closed commencing conservation storage except for releases of account water pursuant to Subsection II E, herein.

(2) The ditches in Colorado Water District 67 will be removed from the Colorado priority system when the sum of the flows of the Arkansas River at the Las Animas gaging station and the Purgatoire River at the Las Animas gaging station, exclusive of separate deliveries of other water under Section III, herein, indicates that conservation storage will occur.

(3) All inflows entering said reservoir during a period of conservation storage in the summer storage season shall accrue to conservation storage. Conservation storage shall be

released into the accounts specified in Section II D beginning at the first request for release of account water by a Colorado Water District 67 ditch or by Kansas or beginning 48 hours after commencement of conservation storage, whichever occurs first.

C. Exhaustion of Conservation Storage –

(1) For the purposes of Compact Article V F, the conservation pool shall be deemed exhausted whenever conservation storage has been completely released into the accounts. When this occurs, Colorado shall administer the decreed rights of water users in Colorado Water District 67 as against each other and as against all rights now or hereafter decreed to water users diverting upstream from John Martin Dam on the basis of relative priorities in the same manner in which their respective priority rights were administered before John Martin Reservoir began to operate and as though John Martin Dam had not been constructed. However, during these times, inflows shall, to the extent practical, be measured and released from the reservoir without temporary storage or averaging flows, and conservation storage may not be accumulated nor may storage in the accounts be increased except by deliveries of other water under Section III, herein.

(2) Administration in Colorado under decreed priorities shall be initiated so that ditches upstream from John Martin Reservoir shall deliver to the priorities of Colorado Water District 67 ditches water at the Arkansas

River at the Las Animas gaging station coincident with the exhaustion of the conservation storage when taking the flow of all waters, including that of the Purgatoire River, into appropriate consideration.

D. Release into the Accounts –

(1) When conservation storage is being released into the accounts according to the provisions of Subsections II A or II B, herein, it shall be released at the total rate of 1,000 cfs. However, when conservation storage exceeds 20,000 acre-feet, it shall be released at the total rate of 1,250 cfs.

(2) Releases of conservation storage shall be into accounts and said releases shall be apportioned 60 percent for the accounts of the Colorado Water District 67 ditches and 40 percent for the Kansas account.

(3) The releases for the Colorado Water District 67 ditches shall be distributed into individual accounts according to the following percentages:

Fort Bent	9.90 percent
Keesee	2.30 percent
Amity	49.50 percent
Lamar	19.80 percent
Hyde	1.30 percent
Manvel	2.40 percent
X-Y & Graham	5.10 percent
Buffalo	8.50 percent
Sisson – Stubbs	1.20 percent

E. Releases Out of Accounts –

(1) Kansas and the various Colorado ditches may demand the release of water contained

in their respective accounts, including those established in Section III herein, at any time at whatever rates they desire.

(2) Releases of water from the accounts, including those established in Section III herein, may be made simultaneously with releases from conservation storage into the accounts. However, such simultaneous releases cannot create deficits in those accounts.

(3) All such releases of account water from John Martin Reservoir to Colorado water users are subject to transit losses between John Martin Dam and the point of diversion from the Arkansas River, as determined by the Colorado Division Engineer, and the transit losses shall be borne by such releases.

(4) Releases of Kansas account water shall be measured at the Stateline as provided in Compact Article V E (3) allowing appropriate arrival times. If transit losses occur, those losses shall be determined by the Colorado Division Engineer and a representative of the Kansas Division of Water Resources and shall be replenished from the Kansas transit loss account. In the event that such losses at the end of the delivery are greater than the total in the Kansas transit loss account, then the deficit shall be made up from the next available transfers of other water under Subsection III D.

(5) The water users and the responsible officials of both Colorado and Kansas shall do their utmost to achieve maximum beneficial use including calling for deliveries of Kansas

account water during reasonable and favorable river conditions. When transit losses are deemed by the Colorado Division Engineer to be excessive, he shall so advise the receiving entity. Conversely, when river conditions are favorable for a delivery to Kansas, he shall so advise the Kansas Water Commissioner.

F. Evaporation charges shall be made against water stored in the accounts, including those established in Section III, herein, and the Kansas transit loss account, using formulas and procedures approved by the Colorado Division Engineer and a representative of the Kansas Division of Water Resources and using, when available, pan evaporation data provided by the Corps of Engineers. The evaporation charges shall be prorated amongst conservation storage and the accounts according to the amounts in them.

G. In the event that runoff conditions occur in the Arkansas River basin upstream from John Martin Reservoir that cause water to spill physically over the project's spillway, then water stored in the permanent pool in excess of 10,000 a.f. shall spill before the accounts granted in Subsection III A, B, and C, which shall spill before the accounts granted in Section II, which shall spill before the Kansas Transit Loss Account, all of which shall spill before the conservation pool water. The amount of spill from the accounts shall be prorated amongst them according to the amounts in them at the beginning of spill. During times of spill, the permanent pool shall occupy flood control space as provided in the Administration's Resolution of August 14, 1976, and Public Law 89-298.

III. Other Water for Regulation by John Martin Reservoir:

A. The Amity may store such water as it could otherwise divert from the Arkansas River for storage in the Great Plains Reservoir system in its account granted in Section II, herein. This water will be in addition to water released into the Amity account under Section II, herein.

B. An account for the Fort Lyon Canal is hereby granted in John Martin Reservoir for agricultural purposes only. The Fort Lyon Canal may deliver water into said account under an approved Pueblo winter storage plan subject to the limitations that total quantity in the account at any time cannot exceed 20, 000 acre-feet and that the delivery cannot include water that otherwise would have accumulated in conservation storage. The Fort Lyon may use water in this account for exchange with existing priorities. However, this account shall not be used in any manner to increase the permanent recreation pool, either by exchange, transfer, change of use, or otherwise. In the event that water accumulated in this account has not been completely released by the end of the compact year, then that water shall become conservation storage controlled by Subsection II A, herein.

C. An account for the Las Animas Consolidated Canal Company is hereby granted in John Martin Reservoir for agricultural purposes only. The Las Animas Consolidated Canal Company may deliver water into said account under an approved Pueblo winter storage plan subject to the limitations that total quantity in the account at any time cannot exceed 5,000 acre-feet and

that the delivery cannot include water that otherwise would have accumulated in conservation storage. The Las Animas Consolidated may use water in this account for exchange with existing priorities. However, this account shall not be used in any manner to increase the permanent recreation pool, either by exchange, transfer, change of use, or otherwise. In the event that water accumulated in this account has not been completely released by the end of the compact year, then that water shall become conservation storage controlled by Subsection II A.

D. Thirty-five percent of all water deliveries to John Martin Reservoir, under Subsections III A, III B, and III C, herein, during any compact year shall be transferred into the accounts for Kansas transit losses, for Kansas, and for Colorado Water District 67 ditches at the time of delivery in the following manner: First, transfers from deliveries shall make up deficits, if any, in the Kansas transit loss account which result from Subsection II E (4), herein, and shall then also fill the said Kansas transit loss account to the amount of 1,700 acre-feet. Then, of all such water delivered in excess of this specified amount, 11 percent of those deliveries shall be transferred to the Kansas account and 24 percent of those deliveries shall be transferred to the account of the Colorado Water District 67 ditches. Transfers into the accounts for Colorado Water District 67 ditches shall be distributed according to the percentages in Subsection II D (3), herein; except the Amity shall not share in distributions of deliveries under Subsection III A, herein.

IV. A permanent recreation pool has been authorized by the August 14, 1976, Resolution of the Administration. For purposes of the Resolution, this permanent recreation pool shall be considered a separate account and deliveries made to it are not subject to the transfers provided in Subsection III D, herein. The permanent recreation pool will, however, stand its pro rata share of evaporation as provided in the Administration's Resolution of August 14, 1976.

V. In the event of injury either to entities in Colorado or to Kansas, there shall be restitution from the first account water thereafter available from the entity receiving improper benefits. The engineering committee shall quantify such injury, subject to the approval of the Administration

VI. Adoption of this resolution does not prejudice the ability of Kansas or of any Colorado ditch to object or to otherwise represent its interest in present or future cases or controversies before the Administration or in a court of competent jurisdiction.

VII. This agreement shall be, and continue to be, in full force and effect from and after the date of execution of this resolution until March 31, 1981, and year to year thereafter subject to the following provisions:

A. Not later than December 1 of each year, the Colorado Division Engineer shall make an accounting of the operation under this resolution for the previous compact year available to the Operations Committee of the Administration and to interested parties. Either Colorado or Kansas, through its compact delegation, may then terminate this resolution on the next succeeding March 31 by giving written notice to the Administration by February 1 of the same compact year.

B. In the event this resolution is so terminated, then entities storing water in accounts prior to such termination may utilize such water during the next irrigation season under the provisions of this resolution. Water not utilized by the following November 1 shall revert to conservation storage.

VIII. This resolution supersedes in its entirety the agreement of December 12, 1978, concerning Amity-Great Plains water and the Resolution concerning an Interim Operating Plan for John Martin Reservoir entered into on March 21, 1980. All water delivered into the accounts established under the authorities of these two resolutions shall be forwarded and credited, without deductions, to the accounts for the same entities that are established in this operating plan.

Entered this 24th day of April, 1980, by special telephonic meeting, and revisions approved on May 10, 1984 and December 11, 1984.

/s/ Frank G. Cooley
Chairman
Arkansas River
Compact
Administration

/s/ James G. Rogers
Secretary
Arkansas River
Compact
Administration

/s/ J. William McDonald
Colorado Member
Arkansas River
Compact
Administration

/s/ David L. Pope
Kansas Member
Arkansas River
Compact
Administration

APPENDIX – Exhibit 11

Kansas Exhibit 111*** "Effects of Post-Compact Pumping and the Winter Water Program on Stateline Flows"

PLAINTIFF'S EXHIBIT 111***

Case No. 105

EFFECTS OF POST-COMPACT PUMPING AND THE WINTER WATER PROGRAM ON STATELINE FLOWS

Revised 2/23/92

Institutional Conditions					Depletions of Stateline Flows 1950 - 1985 (thousand acre – feet)	Depletions Less Accretions of Stateline Flows 1950 - 1985 (thousand acre – feet)	Depletions of Usable Stateline Flows 1950 - 1985 (thousand acre – feet)
	Pumping	Winter Water	1980	Trans Mtn			
Combined Effects	H C	H C	C C	H O	650	608	489
Historical Pumping	H C	H H	H H	H H	852	825	620
Winter Water	H H	H C	C C	H H	53	17	40
Future Pumping	P C	C C	C C	O O	1150	1146	783

H = Historical Conditions
C = Compact Conditions
O = No transmountain deliveries
P = Projected (future) pumping

APPENDIX – Exhibit 12

Order to Correct Record re Defendant's Exhibits, filed January 5, 1994

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff,	)	
v.	)	No. 105 Original
STATE OF COLORADO,	)	October Term, 1985
Defendant,	)	
and	)	
UNITED STATES OF AMERICA,	)	
Defendant-Intervenor.	)	

ORDER TO CORRECT RECORD RE DEFENDANT'S EXHIBITS

(Filed Jan. 5, 1994)

The State of Colorado, the State of Kansas, and the United States have filed a Stipulation to Correct Record Re Defendant's Exhibits. Based on the Stipulation, which is hereby approved, the record of proceedings held before Special Master Arthur L. Littleworth is corrected as follows:

1. The record of proceedings for Monday, April 29, 1991, Volume LXXI (71) at page 4, line 19, is hereby corrected to refer to Defendant's Exhibit 88a, b, and c, not Defendant's Exhibit 168a, b, and c.

2. The record of proceedings for Monday, April 29, 1991, Volume LXXI (71) at page 23, lines 21-22, is hereby corrected to state that Defendant's Exhibit 88a, b, and c, not Defendant's Exhibit 168a, b, and c, was admitted. The

summary of the final status of the Colorado exhibits shall reflect that Defendant's Exhibit 88a, b, and c was admitted on April 29, 1991, and shall not include Defendant's Exhibit 168.

3. The record of proceedings for Wednesday, April 17, 1991, Volume LXIV (64) at page 66, line 23, is hereby corrected to refer to Defendant's Exhibit 679*, not Defendant's Exhibit 689*. The summary of the final status of the Colorado exhibits shall not include Defendant's Exhibit 689*.

DATE: Jan. 5, 1994.

/s/ Arthur L. Littleworth
Arthur L. Littleworth
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business address is Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502.

I am readily familiar with Best, Best & Krieger's practice for collecting and processing correspondence for mailing with the United States Postal Service. Under that practice, all correspondence is deposited with the United States Postal Service the same day it is collected and processed in the ordinary course of business.

On January 5, 1994, I served the within **ORDER TO CORRECT RECORD RE DEFENDANT'S EXHIBITS** by placing a copy of the document in a separate envelope for each addressee named below and addressed to each such addressee as follows:

John B. Draper
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Patricia Weiss, Esq.
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Andrew F. Walch, Esq.
James J. DuBois, Esq.
U.S. Department of Justice
General Litigation Section
999 18th Street, Suite 945
Denver, Colorado 80202

On January 5, 1994, at the office of Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502, I sealed and placed each envelope for collection and deposit by Best, Best & Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on January 5, 1994, at Riverside, California.

/s/ Sandra L. Simmons
Sandra L. Simmons

APPENDIX – Exhibit 13

Order Regarding Plaintiff's
Exhibits, filed March 11, 1994

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, vs. STATE OF COLORADO, Defendant, and UNITED STATES OF AMERICA, Defendant-Intervenor.	)	No. 105, Original October Term 1985

ORDER REGARDING PLAINTIFF'S EXHIBITS

(Filed Mar. 11, 1994)

The State of Kansas, the State of Colorado, and the United States, by their respective counsel, have filed a Stipulation Regarding Plaintiff's Exhibits. Based on the Stipulation, which is hereby approved, the following is hereby ordered:

1. In the record of proceedings held before Special Master Arthur L. Littleworth, Volume 41 (January 16, 1991), at page 6, line 10, is in error in listing Plaintiff's Exhibit 61* and should have listed Plaintiff's Exhibit 61. The exhibits listed on page 6 were subsequently admitted on page 17, at lines 7-10. Accordingly, Volume 41 of the record of proceedings is hereby corrected as stated above, with the effect that the record of proceedings shall reflect that Plaintiff's Exhibit 61 is admitted. The summaries of the final status of the Kansas Exhibits shall reflect that

Plaintiff's Exhibit 61 was admitted and that Plaintiff's Exhibit 61* was not admitted.

2. In the record of proceedings held before the Special Master, Volume 31 (November 27, 1990), at pages 43, 56, 57, 58, 61, 66, 72, 74, 75, 76, 77, 78, and 80, is in error with regard to references to Plaintiff's Exhibit 358, which references should be to Plaintiff's Exhibit 358*. Accordingly, Volume 31 of the record of proceedings is hereby corrected to show that Plaintiff's Exhibit 358* was referred to on the pages listed above and was admitted. The summaries of the final status of the Kansas Exhibits shall reflect that Plaintiff's Exhibit 358* was admitted and shall not include Plaintiff's Exhibit 358.

3. In the record of proceedings held before the Special Master, Volume 35 (December 17, 1990), at page 116 (line 11) and Volume 36 (December 18, 1990), at pages 5, 64 (line 12) and 124 (line 28), are in error with regard to references to Plaintiff's Exhibit 371, which references should be to Plaintiff's Exhibit 371*. Accordingly, Volumes 35 and 36 of the record of proceedings are hereby corrected to show that Plaintiff's Exhibit 371* was referred to and admitted on the pages and lines listed above. The summaries of the final status of the Kansas Exhibits shall reflect that Plaintiff's Exhibit 371* was admitted and that Plaintiff's Exhibit 371 was discussed but not admitted.

4. Plaintiff's Exhibit 389** is hereby admitted into evidence as conforming to the large version of the map entitled "Ditch Service Areas for 1990" testified to by Mr. Frost and discussed by counsel in the record of proceedings before the Special Master in Volume 27 (November

13, 1990) at pages 76-81. Plaintiff's Exhibit 389*, the hand-held version discussed in the same transcript at pages 78-81, shall remain lodged with the Court, but not admitted. Therefore, in the record of proceedings before the Special Master, Volume 27, at pages 19, 46, 76 and 82, shall be modified with regard to references to Plaintiff's Exhibit 389, which references shall be to Plaintiff's Exhibit 389**. The summaries of the final status of the Kansas exhibits shall reflect that Plaintiff's Exhibit 389** was admitted and shall reflect that Plaintiff's Exhibit 389* was the subject of testimony, but not admitted, and shall not include Plaintiff's Exhibit 389.

5. In the record of proceedings held before the Special Master, Volume 27 (November 13, 1990), at pages 19 and 46, is in error with regard to references to Plaintiff's Exhibit 394, which references should be to Plaintiff's Exhibit 394*. Accordingly, Volume 27, at pages 19 and 46, is hereby corrected to refer to Plaintiff's Exhibit 394*. The summaries of the final status of the Kansas Exhibits shall reflect that Plaintiff's Exhibit 394* was the subject of testimony, but not admitted, and shall not include Plaintiff's Exhibit 394.

6. In the record of proceedings held before the Special Master, Volume 27 (November 13, 1990), at pages 19 and 46, is in error with regard to references to Plaintiff's Exhibit 395, which references should be to Plaintiff's Exhibit 395*. Accordingly, Volume 27, at pages 19 and 46, is hereby corrected to refer to Plaintiff's Exhibit 395*. The summaries of the final status of the Kansas Exhibits shall reflect that Plaintiff's Exhibit 395* was the subject of testimony, but not admitted, and shall not include Plaintiff's Exhibit 395.

7. In the record of proceedings held before the Special Master, Volume 27 (November 13, 1990), at pages 19 and 46, is in error with regard to references to Plaintiff's Exhibit 397, which references should be to Plaintiff's Exhibit 397*. Accordingly, Volume 27, at pages 19 and 46, is hereby corrected to refer to Plaintiff's Exhibit 397*. The summaries of the final status of the Kansas Exhibits shall reflect that Plaintiff's Exhibit 397* was the subject of testimony, but not admitted, and shall not include Plaintiff's Exhibit 397.

8. In the record of proceedings held before the Special Master, Volume 27 (November 13, 1990), at pages 19 and 46, is in error with regard to references to Plaintiff's Exhibit 398, which references should be to Plaintiff's Exhibit 398*. Accordingly, Volume 27, at pages 19 and 46, is hereby corrected to refer to Plaintiff's Exhibit 398*. The summaries of the final status of the Kansas Exhibits shall reflect that Plaintiff's Exhibit 398* was the subject of testimony, but not admitted, and shall not include Plaintiff's Exhibit 398.

9. In the record of proceedings held before the Special Master, Volume 27 (November 13, 1990), at pages 19 and 46, is in error with regard to references to Plaintiff's Exhibit 399, which references should be to Plaintiff's Exhibit 399*. Accordingly, Volume 27, at pages 19 and 46, is hereby corrected to refer to Plaintiff's Exhibit 399*. The summaries of the final status of the Kansas Exhibits shall reflect that Plaintiff's Exhibit 399* was the subject of testimony, but not admitted, and shall not include Plaintiff's Exhibit 399.

10. In the record of proceedings held before the Special Master, Volume 27 (November 13, 1990), at pages 19 and 46, is in error with regard to references to Plaintiff's Exhibit 400, which references should be to Plaintiff's Exhibit 400*. Accordingly, Volume 27, at pages 19 and 46, is hereby corrected to refer to Plaintiff's Exhibit 400*. The summaries of the final status of the Kansas Exhibits shall reflect that Plaintiff's Exhibit 400* was the subject of testimony, but not admitted, and shall not include Plaintiff's Exhibit 400.

11. In the record of proceedings held before the Special Master, in Volumes 27 and 28 (November 13 and 14, 1990, respectively), all pages that refer to, and page 95 of Volume 27 that admitted, Plaintiff's Exhibit 401 are in error and should have referred to and admitted Plaintiff's Exhibit 401*. Accordingly, Volumes 27 and 28 of the record of proceedings are hereby corrected to refer to Plaintiff's Exhibit 401*. The summaries of the final status of the Kansas exhibits shall reflect that Plaintiff's Exhibit 401* was admitted and shall not include Plaintiff's Exhibit 401.

12. In the record of proceedings held before the Special Master, in Volume 27 (November 13, 1990), all pages that refer to, and page 102 that admitted, Plaintiff's Exhibit 402 are in error and should have referred to and admitted Plaintiff's Exhibit 402*. Accordingly, Volume 27 of the record of proceedings is hereby corrected to refer to Plaintiff's Exhibit 402*. The summaries of the final status of the Kansas Exhibits shall reflect that Plaintiff's Exhibit 402* was admitted and shall not include Plaintiff's Exhibit 402.

13. In the record of proceedings held before the Special Master, in Volume 27 (November 13, 1990), all pages that refer to, and page 133 that admitted, Plaintiff's Exhibit 403 are in error and should have referred to and admitted Plaintiff's Exhibit 403*. Accordingly, Volume 27 of the record of proceedings is hereby corrected to refer to Plaintiff's Exhibit 403*. The summaries of the final status of the Kansas Exhibits shall reflect that Plaintiff's Exhibit 403* was admitted and shall not include Plaintiff's Exhibit 403.

14. In the record of proceedings held before the Special Master, in Volume 27 (November 13, 1990), all pages that refer to, and page 137 that admitted, Plaintiff's Exhibit 404 are in error and should have referred to and admitted Plaintiff's Exhibit 404*. Accordingly, Volume 27 of the record of proceedings is hereby corrected to refer to Plaintiff's Exhibit 404*. The summaries of the final status of the Kansas Exhibits shall reflect that Plaintiff's Exhibit 404* was admitted and shall not include Plaintiff's Exhibit 404.

15. In the record of proceedings held before the Special Master, in Volume 27 (November 13, 1990), all pages that refer to, and page 140 that admitted, Plaintiff's Exhibit 406 are in error and should have referred to and admitted Plaintiff's Exhibit 406*. Accordingly, Volume 27 of the record of proceedings is hereby corrected to refer to Plaintiff's Exhibit 406*. The summaries of the final status of the Kansas Exhibits shall reflect that Plaintiff's Exhibit 406* was admitted and shall not include Plaintiff's Exhibit 406.

16. In the record of proceedings held before the Special Master, in Volumes 27, 28 and 29 (November 13, 14 and 15, 1990, respectively), all pages that refer to, and page 56 of Volume 27 that admitted, Plaintiff's Exhibit 471 are in error and should have referred to and admitted Plaintiff's Exhibit 471*. Accordingly, Volumes 27, 28 and 29 of the record of proceedings are hereby corrected to refer to Plaintiff's Exhibit 471*. The summaries of the final status of the Kansas Exhibits shall reflect that Plaintiff's Exhibit 471* was admitted and shall not include Plaintiff's Exhibit 471.

DATED: March 11, 1994.

/s/ Arthur L. Littleworth
Arthur L. Littleworth
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business address is Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502.

I am readily familiar with Best, Best & Krieger's practice for collecting and processing correspondence for mailing with the United States Postal Service. Under that practice, all correspondence is deposited with the United States Postal Service the same day it is collected and processed in the ordinary course of business.

On March 11, 1994, I served the within **ORDER REGARDING PLAINTIFF'S EXHIBITS** by placing a copy of the document in a separate envelope for each addressee named below and addressed to each such addressee as follows:

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On March 11, 1994, at the office of Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502, I sealed and placed each envelope for collection and deposit by Best, Best & Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on March 11, 1994, at Riverside, California.

/s/ Sandra L. Simmons
Sandra L. Simmons

(17)

Supreme Court, U.S.
FILED
NOV 17 1994
OFFICE OF THE CLERK

No. 105, ORIGINAL

In The

SUPREME COURT OF THE UNITED STATES
October Term, 1994

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

and

UNITED STATES OF AMERICA,

Defendant-Intervenor.

KANSAS' EXCEPTIONS TO THE 1994 REPORT OF THE SPECIAL MASTER AND BRIEF IN SUPPORT OF EXCEPTIONS

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November 17, 1994

No. 105, ORIGINAL

In The
SUPREME COURT OF THE UNITED STATES
October Term, 1994

STATE OF KANSAS,
Plaintiff,

v.

STATE OF COLORADO,
Defendant,

and

UNITED STATES OF AMERICA,
Defendant-Intervenor.

KANSAS' EXCEPTIONS TO THE 1994 REPORT OF THE SPECIAL MASTER

The State of Kansas takes exception to the following recommendations in the Special Master's 1994 Report:

1. That the Court grant Colorado's Motion to Dismiss Kansas' Trinidad Reservoir Claim;

2. That the Court reject Kansas' claim that Colorado's Winter Water Storage Program has violated the Arkansas River Compact; and

3. That the Court reject Kansas' method for determining the usability of depletions of stateline flows pursuant to Article IV-D of the Arkansas River Compact.

Respectfully submitted,

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KANSAS' BRIEF IN SUPPORT OF EXCEPTIONS

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November 17, 1994

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v.

STATE OF COLORADO,
Defendant,

and

UNITED STATES OF AMERICA,
Defendant-Intervenor.

KANSAS' BRIEF IN SUPPORT OF EXCEPTIONS

QUESTIONS PRESENTED

1. Did Colorado violate the Arkansas River Compact by refusing to abide by the Trinidad Reservoir Operating Principles adopted by the Arkansas River Compact Administration?

2. Did the Special Master err in rejecting Kansas' claim that Colorado's Winter Water Storage Program has violated the Arkansas River Compact:

   (a) Because he placed the risk of uncertainty resulting from a lack of Colorado data on Kansas; or

   (b) Because he relied on a basis as to which the record was admittedly incomplete?

3. Did the Special Master err under Compact Article IV-D when he chose a long-term averaging method for determining usability and rejected Kansas' daily method?

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JURISDICTION

The State of Kansas invoked the original jurisdiction of the Court under Article III, Section 2, Clause 2 of the United States Constitution and the Judiciary Act, 28 U.S.C. § 1251(a) (1988) on December 16, 1985. Leave to file a bill of complaint was granted by the Court on March 24, 1986.

CONSTITUTIONAL PROVISIONS, STATUTES AND REGULATIONS INVOLVED

This case involves:

1. Article III, Section 2, Clause 2 of the United States Constitution which provides in pertinent part as follows:

> In all Cases affecting Ambassadors, other public Ministers and Consuls, and those in which a State shall be a Party, the supreme Court shall have original Jurisdiction.

2. 28 U.S.C. § 1251(a) (1988) which provides as follows:

> § 1251. Original jurisdiction
> (a) The Supreme Court shall have original and exclusive jurisdiction of all controversies between two or more States.

3. The Arkansas River Compact, 63 Stat. 145 (1949) ("Compact") which is reprinted as Exhibit 1 in the Appendix ("App.") to the Master's 1994 Report ("Rep.") and particularly Articles II, IV-D and VIII-A & -B thereof. Article II provides as follows:

> The provisions of this Compact are based on (1) the physical and other conditions peculiar to the Arkansas River and its natural drainage basin, and the nature and location of irrigation and other developments and facilities in connection therewith; (2) the opinion of the

United States Supreme Court entered December 6, 1943, in the case of *Colorado v. Kansas* (320 U.S. 383) concerning the relative rights of the respective States in and to the use of waters of the Arkansas River; and (3) the experience derived under various interim executive agreements between the two States apportioning the waters released from the John Martin Reservoir as operated by the Corps of Engineers. Rep., App., Ex. 1, at App. 2.

Article IV-D provides as follows:

D. This Compact is not intended to impede or prevent future beneficial development of the Arkansas River basin in Colorado and Kansas by Federal or State agencies, by private enterprise, or by combinations thereof, which may involve construction of dams, reservoir, and other works for the purposes of water utilization and control, as well as the improved or prolonged functioning of existing works: Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction. *Id.*, at App. 5.

Articles VIII-A & -B provide as follows:

A. To administer the provisions of this Compact there is hereby created an interstate agency to be known as the Arkansas River Compact Administration herein designated as "The Administration."

B. The Administration shall have power to:

(1) Adopt, amend and revoke by-laws, rules and regulations consistent with the provisions of this Compact;

(2) Prescribe procedures for the administration of this Compact: Provided, that where such procedures involve the operations of John Martin Reservoir Project they shall be subject to the approval of the District Engineer in charge of said Project;

(3) Perform all functions required to implement this Compact and to do all things necessary, proper or convenient in the performance of its duties. *Id.*, at App. 11.

4. Trinidad Dam and Reservoir Project Operating Principles and Minutes showing adoption by the Arkansas River Compact Administration on June 6, 1967, which are included in the Appendix to this Brief.

STATEMENT OF THE CASE

This is an action by the State of Kansas to enforce the Arkansas River Compact approved by the legislatures of Kansas and Colorado and by Congress in 1949. After trial, the Master found that increased well pumping in Colorado, Kansas' largest claim, constituted a violation of the Compact, but he ruled against Kansas on several important points.

I. Physical Features.

The Arkansas River rises in the Rocky Mountains near Leadville, Colorado, and flows generally southerly and then easterly through the city of Pueblo, Colorado. From Pueblo it continues eastward across the plains to the Colorado-Kansas state line. After crossing the state line, the river flows eastward to Garden City, Kansas, and through the states of Kansas, Oklahoma and Arkan-

sas, ultimately entering the Mississippi River southeast of Little Rock, Arkansas.

The portion of the river at issue extends from the river's headwaters to Garden City, Kansas. *See* Rep., vol. I, at 35-40. The primary depletions of water in this reach are caused by the irrigation of crops. *See id.* In the portion of the Arkansas River between Pueblo and the state line, the water is applied to some 320,000 acres of irrigated land through diversion and rediversion of surface water and withdrawals from some 2,500 wells along the river. Rep., vol. II, at 203; Pl. Ex. 30, Table 1 (R. vol. 21, at 117, vol. 22, at 21, 30), Pl. App., Item 1.[1]

The three major reservoirs involved in this litigation are (1) John Martin Reservoir, about 58 miles upstream of the state line in Colorado; (2)Pueblo Reservoir at Pueblo, about 130 miles above John Martin Reservoir; and (3) Trinidad Reservoir at Trinidad, Colorado, somewhat more than 160 miles above John Martin Reservoir on the Purgatoire River, a major tributary of the Arkansas River. *See, e.g.*, Rep., vol. I, Map in pocket.

II. The Compact.

In the first half of the twentieth century, Kansas twice petitioned this Court, unsuccessfully, to establish an equitable apportionment of the flows of the Arkansas River and to obtain an injunction against further depletions in Colorado. *See Kansas v. Colorado*, 206 U.S. 46 (1907), and *Colorado v. Kansas*, 320 U.S. 383 (1943). In 1943 the Court recommended that the states resolve their differences by compact under Article I, Section 10, Clause 3 of the Constitution. *Colorado v. Kansas*, 320 U.S. at 392.

In response to this recommendation and in recognition that the states could benefit from the construction of John Martin Res-

[1] The pages in the record at which an exhibit appears, at which it was offered in evidence, and at which it was ruled on by the Master will be given in parentheses. *See* Sup. Ct. Rule 24.5. "R" refers to the trial transcript of proceedings.

ervoir by the U.S. Army Corps of Engineers, the states negotiated a compact, equitably apportioning the waters of the Arkansas River.[2] *See* Arkansas River Compact, Arts. I, II (Rep., App., Ex. 1, at App. 1-2). The states reached agreement on December 14, 1948, *id.* at App. 16; the legislatures of Colorado and Kansas approved the Compact shortly thereafter; and Congress approved the Compact on May 31, 1949, Act of May 31, 1949, 63 Stat. 145.

The Compact consists of nine articles. In addition to the statements of purpose and basis (Arts. I & II), the Compact includes provisions regarding: Definitions (Art. III); limitations on the scope of the Compact, John Martin Reservoir generally and prohibition of material depletions of the river in usable quantity or availability (Art. IV); operating procedures for John Martin Reservoir (Art. V); jurisdiction (Art. VI); miscellaneous subjects (Art. VII); creation, powers and duties of the Arkansas River Compact Administration ("Compact Administration") (Art. VIII); and sovereignty of the United States and amendment of the Compact (Art. IX).

One of the Compact negotiators' purposes was to maintain the status quo. Rep., vol. I, at 99-102; Jt. Ex. 4, at 12-54 to -55 (R. vol. 5, at 53, 83, 86), Pl. App., Item 10; Jt. Ex. 3, at 13-100 (R. vol. 5, at 53, 83, 86), Pl. App., Item 9; Pl. Ex. 129, vol. II, at 387 (R. vol. 2, at 29, R. vol. 9, at 84, Admitted by written order of 11/16/93), Pl. App., Item 2. The uses already established in Colorado and Kansas were to be preserved but not enlarged, and the benefits of John Martin Reservoir were to be equitably apportioned. These purposes appear in Articles I-B and IV-D.

[2] "Waters of the Arkansas River" means the waters originating in the natural drainage basin of the Arkansas River, including its tributaries, upstream from the state line, and excluding waters brought into the Arkansas River Basin from other river basins. Compact, Art. III-B, Rep., App., Ex. 1, at App. 2-3.

III. Colorado's Violations of the Compact.

After the Compact was adopted, Colorado undertook three developments which led to Kansas' claims that Colorado has violated the Arkansas River Compact:

First, Colorado permitted the installation of some 1,500 wells along the river tapping the shallow alluvial aquifer which is in direct hydraulic connection with the river. *See, e.g.*, Pl. Ex. 30, Table 1 (R. vol. 21, at 117, vol. 22, at 21, 30), Pl. App., Item 1; Rep., vol. I, at 113-17. In addition, Colorado allowed increased withdrawals from pre-Compact wells over and above the amounts that had been pumped prior to the Compact. R. vol. 82, at 139, Pl. App., Item 23. Although Colorado was one of the original prior appropriation doctrine states with respect to surface water,[3] it has never effectively regulated the wells in the Arkansas River Valley under the prior appropriation system. R. vol. 18, at 46, Pl. App., Item 20; Rep., vol. I, at 139. If wells had been regulated, most would not have been allowed to pump because they were generally later in priority compared to Colorado surface water rights. In fact, most were installed after the adoption of the Compact. R. vol. 15, at 132-34, Pl. App., Item 19; R. vol. 116, at 69; Pl. App., Item 27.

Second, Colorado sought federal funding for the Trinidad Dam and Reservoir Project, which had been authorized by Congress in 1958, Act of July 3, 1958; Jt. Ex. 35, at 309 (R. vol. 111, at 5, 6), Pl. App., Item 15. In order to obtain the concurrence of Kansas, Colorado agreed to Kansas' demand that the Compact Administration adopt a set of Operating Principles for Trinidad Dam and Reservoir Project ("Operating Principles") (Jt. Ex. 19,

[3] The "Colorado Doctrine," indeed, was another name for the pure prior appropriation law first enunciated in *Coffin v. Left Hand Ditch Co.*, 6 Colo. 443 (1882); *see* Frank J. Trelease, *Water Law* 10-13, 29 (2d ed. 1974). This is the "first-in-time, first-in-right" legal doctrine governing the allocation of water in most Western states in which water rights are established by application to beneficial use and not by ownership of riparian lands.

June 6, 1967 minutes (R. vol. 17, at 87, 89)), Pl. App., Item 12. The principles had been developed by the U.S. Bureau of Reclamation based on hydrologic studies performed by the Bureau. Rep., vol. III, at 388-89. Once the Compact Administration adopted the Operating Principles, funds were appropriated and the project was built and became operational in 1979. *Id.*, at 395-96. However, as the Master correctly assumed in his report, Colorado violated the Operating Principles within a year after the project began to operate, by storing water that should have flowed downstream to other Colorado and Kansas irrigators. *See* Jt. Ex. 18-32, at 47-48 (R. vol. 20, at 100, vol. 21, at 34, 36), Pl. App. No. 11. The Bureau of Reclamation analyzed the reservoir operations and concluded that what Colorado had done from 1979 through 1984 was "a departure from the intent of the Operating Principles." Jt. Ex. 23, at 55 (R. vol. 17, at 69, R. vol. 18, at 21, 22), Pl. App., Item 13.

Third, in 1976, Colorado initiated the Winter Water Storage Program (WWSP). Rep., vol. II, at 309. The program consists of storing water in Pueblo Reservoir and other off stream reservoirs—water which before 1976 had been diverted onto the fields in Colorado for winter irrigation—and later releasing the stored water to irrigate crops during the summer months. *Id.*, at 308-11.

IV. Procedural History.

After the Court granted Kansas' Motion for Leave to File a Bill of Complaint, Colorado filed its Answer and Counterclaim, denying the allegations of Compact violations and asserting several defenses. Colorado's Counterclaim essentially made two claims: (1) that Kansas had stored water released from John Martin Reservoir in Lake McKinney Reservoir in Kansas in violation of the Compact; and (2) that increased post-Compact pumping in Kansas had depleted the surface water supply in Kansas and had caused Kansas users to make additional demands for releases of water stored in John Martin Reservoir in Colorado, to the detriment of Colorado users. *See* Rep., App., Ex. 3. The United

States intervened and filed an Answer relating to Kansas' Trinidad Reservoir and WWSP claims. *See id.*, at Ex. 4.

Prior to trial, the Master bifurcated the case into a liability phase and a remedies phase. *Id.*, at Ex. 6. Trial before the Master on the liability phase concluded on December 16, 1992. The Master submitted his Report to the Court at the end of July 1994. The Master recommended in the Report that the Court reject the equitable defenses of Colorado, recognize the pre-Compact pumping entitlement of Colorado in the amount of 15,000 acre-feet per year and find a violation of the Arkansas River Compact by the State of Colorado with regard to post-Compact well pumping. Rep., vol. I, at 170, vol. II, at 190-200, 336-37. These recommendations are largely in accord with Kansas' position. The Master recommended, however, that Kansas' usable flow method be rejected and that the other two claims by Kansas (Trinidad and WWSP) be denied. He also recommended that the two Colorado counterclaims (Lake McKinney and post-Compact wells in Kansas) be denied for failure of proof. Rep., vol. II, at 336-37.

During trial, each state presented a hydrologic model showing depletions[4] from post-Compact well pumping and the WWSP on flows at the state line. *Id.*, at 228-90. The depletions calculated by each model were then evaluated to determine the amount of depletions that would have been used in Kansas had they been available. *Id.*, at 291-305. According to Kansas' evidence, the net depletions to usable flow caused by increased Colorado pumping and the WWSP during the period 1950-85 were 489,000 acre-feet. Pl. Ex. 111***[5] (R. vol. 89, at 9, 85, vol. 99, at 5) Rep., App.,

[4] Depletions are negative effects on river flows. Depletions of usable flow are negative effects on river flows that would have been diverted by canals for irrigation or that would have recharged a groundwater aquifer. Accretions are positive effects on river flows. "Net" depletions are the depletions that remain after offsetting the effects of transmountain water imported to the Arkansas Basin from the Colorado Basin. Depletions of usable flow at the state line mean less water available to Kansas water users, a result the Compact was intended to prevent.

[5] Asterisks indicate revised versions of exhibits.

Ex. 11. The Master's usable flow method would reduce Kansas' claim by 124,000 acre-feet (25%). Rep., vol. II, at 303. Almost all of the difference in the results of the two methods arises in the period 1975-82, when the effects of a major drought were felt in Kansas, with stateline flows severely reduced and no flows at all for long periods at Garden City. Pl. Ex. 698 (R. vol. 127, at 127, 146), Pl. App., Item 5; Rep., vol. I, at 142; R. vol. 109 at 68-69, Pl. App., Item 25.

Kansas also submitted evidence on the violation of the Trinidad Reservoir Operating Principles from 1979 through 1984, based in large part on a 1988 Report of the Bureau of Reclamation.[6] *See* Rep., vol. III, at 409-10. The Bureau found that the Operating Principles had been departed from, and it performed certain computer modeling studies to quantify the effect of the departure from the Operating Principles on John Martin Reservoir. Jt. Ex. 23, at 55 (R. vol. 17, at 69, vol. 18, at 21, 22), Pl. App., Item 13. Before Colorado offered any evidence, the Master dismissed Kansas' claim because Kansas had not submitted evidence comparing actual operations with "no-project" conditions, an analysis that the Bureau had said was impossible. Jt. Ex. 23, at 26 (R. vol. 17, at 69, vol. 18, at 21, 22), Pl. App., Item 13.

On October 3, 1994, the Court received the Report, ordered it filed and set the schedule for exceptions and briefing. Kansas' Exceptions are submitted in accordance with that schedule.

SUMMARY OF ARGUMENT

I. Trinidad Reservoir Operating Principles.

The Master erred in allowing Colorado to disregard the Trinidad Operating Principles with impunity. The Operating Principles were officially adopted by the Compact Administration with the unanimous approval of the compacting states. Such approval was necessary in order for the project to be built. In return for

[6] Neither state agreed in all respects, however,with the 1988 Bureau Report. *See*, Rep., vol. III, at 378, 396, 403.

this essential approval of the project, Colorado agreed to a method of assessing compliance with Article IV-D of the Compact. The Master's decision deprived Kansas of the benefit of this valid exercise of authority by the Compact Administration, while leaving intact the benefit Colorado received.

This Court has made it clear that unanimous decisions of interstate compact agencies, acting within the scope of their congressionally ratified powers, are binding and that it is improper to use this Court's original jurisdiction to redecide such issues. This Court has enforced such a resolution in the past. *See Texas v. New Mexico*, 462 U.S. 554 (1983). If resolutions of interstate compact agencies have no effect, the compacting states will refuse to adopt cooperative resolutions such as the Trinidad Operating Principles. Moreover, this Court should enforce detailed procedures adopted for the purpose of maintaining the Article IV-D standard.

II. Winter Water Storage Program (WWSP).

The Master decided that there was too much uncertainty in the evidence offered by Kansas to prove its claim regarding Colorado's Winter Water Storage Program. The major cause of such uncertainty was the lack of data which needed to have been collected in the past. The Master effectively placed the risk that there might be such uncertainty on Kansas. However, that is a burden that Kansas cannot possibly satisfy. Rather, the risk that there might be such uncertainty should be on the state that proceeded with the project without either (1) performing sufficient studies and collecting sufficient data to assure compact compliance or (2) agreeing to appropriate limitations necessary to insure compliance with Article IV-D of the Compact, as occurred for the Trinidad Project. That risk should have been placed on Colorado, the state benefitting from the program, not Kansas. Kansas had no way of collecting that data in 1976. It has no way of collecting that data today. The onus of not having collected that data should be on the state benefitting from the development and controlling the collection of the necessary data.

The Master also erred in rejecting the Kansas WWSP claim because he relied on an assumption that accretions might be offset against depletions that Kansas' evidence showed had occurred. Such reliance was incorrect because he found, and it is undisputed, that more evidence was needed to determine whether accretions should be offset against depletions. It was error to reject a claim on an admittedly incomplete record.

III. Usability of Stateline Depletions.

Generally stated, usability is the extent to which river flows (1) were, or would have been divertible at times when water is needed for irrigation or (2) were or could have been recharged to a groundwater aquifer. The method for determining usability adopted by the Master is contrary to Article IV-D of the Compact, which requires that the waters of the Arkansas River shall not be materially depleted in usable quantity or *availability for use* to the water users of Colorado and Kansas. Article IV-D embodies the basic understanding that the usability of waters crossing the state line can vary in time and amount. Therefore, techniques for analyzing usability which do not account for its variability in time and amount should be avoided to the maximum extent possible. The method chosen by the Master clearly does not do that. It averages usability not just over a week or a month, but over the whole study period of 36 years, 1950-85. If a more precise alternative to such an averaging method is available, it should be used to ensure compliance with Article IV-D of the Compact.

There is an alternative to the Master's averaging [illegible]d. There is a method that recognizes the day-to-day variabil ty of usability, namely, Kansas' usable flow method. Yet the Master rejected Kansas' method. He did so on three grounds, two of which are not related to the averaging method at all, but rather relate to questions of uncertainty that he had with respect to the separate hydrologic modeling. Any problems that he perceived with the hydrologic modeling should not have caused him to reject the better and separate method for determining usability. The third ground is merely Colorado's unproved allegation that post-Compact well

pumping in Kansas has increased usability in Kansas beyond pre-Compact levels. The same evidence is required to support that allegation as was required to support the related Colorado counterclaim, which alleged that well depletions in Kansas had increased usability in Kansas and had caused increased calls for releases from John Martin Reservoir. The Master correctly recommended that that counterclaim be dismissed for failure of proof.

ARGUMENT

I. Colorado Has Violated the Arkansas River Compact by Admittedly Refusing to Abide by the Trinidad Reservoir Operating Principles.[7]

A. History of the Operating Principles.

The Master rejected Kansas' claim that violation of the Compact Administration's duly adopted Trinidad Reservoir Operating Principles constituted a violation of the Compact. Kansas presented evidence showing a violation of the Operating Principles and the resulting depletions to John Martin Reservoir conservation storage, part of which is allocated to Kansas under Article V of the Compact. *See* Pl. Ex. 580 (R. vol. 18, at 18), Pl. App., Item 3; R. vol. 18, at 9-10, 16-17, Pl. App., Item 20. The Master held that the Kansas evidence was insufficient because it did not compare the actual operations to pre-Compact conditions. Rep., vol. III, at 426. Departure from the Operating Principles is *ipso facto* a violation of the Compact, and it was entirely sufficient, for purposes of quantifying the effects of the violation, to compare the actual operation with simulated operation as it should have been under the Operating Principles.

Trinidad Reservoir is located just above the city of Trinidad, Colorado, in the southeastern part of the state near the New Mex-

[7] This portion of the Brief relates to the Decision Of Special Master On Colorado's Motion To Dismiss Kansas' Trinidad Reservoir Claim. Rep., vol. III, at 373. The Master has requested that this decision be confirmed by the Court. Rep., vol. II, at 336.

ico border. The reservoir is an onstream reservoir on the Purgatoire River, which is the major tributary of the Arkansas River between Pueblo and John Martin Reservoir. The Purgatoire enters the Arkansas just above the reservoir. *See* Rep., vol. I, Map in pocket. When the project was authorized in 1958, it was recognized that operating limitations would have to be placed on the reservoir to insure compliance with the Compact. *See* Jt. Ex. 35, at 309 (R. vol. 111, at 5, 6), Pl. App., Item 15; Jt. Ex. 34, at 3-4, ¶ 97, at 29, ¶ 144, at 40 (R. vol. 17, at 77, 89), Pl. App., Item 14.

The Bureau of Reclamation thereafter undertook studies, completed in 1961 and 1964, on the basis of which it proposed the Operating Principles. Rep., vol. III, at 388-89. The Operating Principles were reviewed and approved by the Corps of Engineers, the Colorado Water Conservation Board and the Purgatoire River Water Conservancy District. In response to previous correspondence, H. P. Dugan, Regional Director of the Bureau of Reclamation, wrote to the Governor of Kansas on February 1, 1967, stating, in part:

> We are pleased to learn that the Kansas Water Resources Board, on the basis of our report on the irrigation function of the proposed Trinidad Project and additional information furnished by our representatives, has concluded essentially that *the proposed Trinidad Project will not materially deplete the water supply of the Purgatoire River and John Martin Reservoir providing the project is operated in strict conformity with the guidelines used in the Trinidad Project investigations and the "Operating Principles"* contained in the Bureau's Trinidad Irrigation Report.
> *We wish to assure you that the Bureau of Reclamation* in its planning investigations for the proposed Trinidad Project and in developing the "Operating Principles" therefor has been fully aware of and *has diligently and conscientiously endeavored to implement the provisions*

> *of the Arkansas River Compact* so that the interests of the State of Kansas at all times will be fully protected consistent with the provisions of the Arkansas River Compact. Jt. Ex. 44, at 1 (R. vol. 17, at 82, 89), Pl. App., Item 16. (Emphasis added.)

The Governor of Kansas subsequently requested that the Operating Principles be adopted by the Arkansas River Compact Administration. Jt. Ex. 45 (R. vol. 17, at 86, 89), Pl. App., Item 17. This was done by unanimous consent on June 6, 1967. *See* Jt. Ex. 19, June 6, 1967 minutes (R. vol. 17, at 87, 89), Pl. App., Item 12. The Operating Principles were thereby promulgated as an official action of the Compact Administration in furtherance of its mandate to implement the Arkansas River Compact. Colorado agreed to the Operating Principles in the forum provided by the Compact Administration. *See id.*; Jt. Ex. 99, at 1-2 (R. vol. 94, at 24; Admitted by Written Order of 11/16/93), Pl. App., Item 18.

Upon the Compact Administration's approval of the Operating Principles, Congress enacted legislation to provide funding, and the project was built. Rep., vol. III, at 394-95. At the first opportunity to store more water than was allowed by the Operating Principles, however, Colorado permitted the Trinidad Project to do so. Specifically, the water retained in the reservoir from 1979 was not counted against the water stored in 1980 as it should have been, resulting in the storage of water in 1980 that should have been allowed to flow downstream to other users, including Kansas users (a process known as "rollover"). Kansas immediately asserted before the Compact Administration that Colorado had violated the Compact. *See* Jt. Ex. 18-32, at 47-48 (R. vol. 20, at 100, vol. 21, at 34, 36), Pl. App., Item 11. Also, Colorado permitted the storage of winter flows in the reservoir outside the reservoir storage right, with the same effect that water was stored which should have been passed to downstream users, including Kansas users. *See* R. vol. 18, at 9-10, Pl. App., Item 20. Kansas' assertion that these actions violated the Operating Principles was

accepted by the Master for purposes of Colorado's Motion to Dismiss (Rep., vol. III, at 378), which is consistent with the conclusions of the Bureau of Reclamation that rollover and the unauthorized storage of winter water each constitute "a departure from the intent of the Operating Principles." Jt. Ex. 23, at 55 (R. vol. 17, at 69, vol. 18, at 21, 22), Pl. App., Item 13. The Bureau determined that Colorado's failure to abide by the intent of the Operating Principles resulted in average annual depletions of inflows into John Martin Reservoir totalling 11,600 acre-feet for the period 1979-84. *Id.*, at Table 4, Pl. App., Item 13. The Kansas evidence, based on monthly depletions rather than annual averages, showed such depletions to be as high as 27,500 acre-feet for the period 1979-84.[8] Pl. Ex. 580 (R. vol. 18, at 18), Pl. App., Item 3.

B. This Court Should Honor a Unanimous Decision of the Arkansas River Compact Administration.

The Master has accepted Colorado's argument that official action of the Arkansas River Compact Administration is not effective to set procedures for operation of Trinidad Reservoir necessary to comply with the Compact. It was the Master's position that Kansas cannot rely on the official action of the Compact Administration in adopting the Operating Principles but must prove anew in this Court that operation of Trinidad Project in violation of the Operating Principles caused stateline flows to be materially depleted in usable quantity or availability for use. The Master's position requires that the original jurisdiction of this Court be burdened by trial and proof on an issue already decided by the Arkansas River Compact Administration, a body created by the Arkansas River Compact and empowered to implement that Compact.

In *Texas v. New Mexico*, 462 U.S. 554 (1983), this Court addressed a similar question with regard to the Pecos River Com-

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[8] Kansas generally received 40% of inflows to John Martin Reservoir during the study period. *See* Rep. vol. I, at 47.

pact (Act of June 9, 1949, ch. 184, 63 Stat. 159) and the relationship between the Pecos River Commission and this Court. The Court described the Pecos River Commission as follows:

> The Compact also established the Pecos River Commission as a permanent body, in more or less the same form that it had during the negotiations on the Compact. It was to have three Commissioners, one from each State and one representing the United States, but the United States representative could not vote. Art. V(a). Accordingly, the Commission could take official action only with the concurrence of both state Commissioners. The Commission was given broad powers to make all findings of fact necessary to administer the Compact, Arts. V(d)(5)-(10), as well as to"[e]ngage in studies of water supplies of the Pecos River" and to "[c]ollect, analyze, correlate, preserve and report on data as to the stream flows, storage, diversions, salvage, and use of the waters of the Pecos River and its tributaries," Arts. V(d)(3), (4). 462 U.S., at 560.

The Arkansas River Compact Administration is almost identical to the Pecos River Commission. The Arkansas River Compact Administration is also a permanent body established by the Arkansas River Compact in more or less the same form that the Arkansas River Compact Commission had during the negotiations on the Compact. *See* Compact Preamble, Art. VIII, Rep., App., Ex. 1, at App. 1, 11-15. Instead of one commissioner from each state and one representative of the United States, each state has three representatives, and there is one federal representative. *Id.*, at App. 12. However, exactly like the Pecos River Compact Commission, each state has but one vote, and the federal representative cannot vote. *Id.* The Compact Administration can take official action only with the concurrence of both states. *Id.* The Compact Administration may make findings of fact, although, just like the Pecos River Commission, such findings "shall not be conclusive in any court, or before any agency or tribunal but shall constitute prima facie evidence of the facts found." *Id.*, at App. 15; Pecos River Compact, Art. V(f), 63 Stat. at 163. Also like the Pecos River Commission, the Compact Administration is authorized to engage "in the systematic determination and correlation of the facts as to the flow and diversion of the waters of the Arkansas River" and "the procurement, interchange, compilation and publication of all factual data bearing upon the administration of this Compact. . . ." Compact Art. VIII-G, Rep., App., Ex.1, at App. 14.

The Court described New Mexico's contention with respect to the relationship of this Court to the Pecos River Commission as follows:

> It contends that this Court may do nothing more than review official actions of the Pecos River Commission, on the deferential model of judicial review of administrative action by a federal agency, and that this case should be dismissed if we find either that there is no Commission action to review or that the actions the Commission has taken were not arbitrary or capricious. Thus, in New Mexico's view, this suit may be maintained only as one for judicial review of the Commission's quantification of the 1950-1961 shortfall,[9] and the implied acceptance of the Review of Basic Data which, New Mexico argues, that entailed. According to New Mexico, "[this] Court has no authority to act *de novo*

[9] This language refutes the Master's assertion in the case now at bar that "the Court did nothing more than go along with a unanimous finding of the Commission as to river flow depletions for certain years." Rep., vol. III, at 420-21. That the Commission's quantification was a contested issue is further borne out by one of New Mexico's "Questions Presented" in that case: "Whether the Court should review findings of fact the Commission made in 1962 . . . ." New Mexico's Brief in Support of Exceptions at i (Dec. 2, 1982), *Texas v. New Mexico*, 462 U.S. 554 (1983) (No. 65, Original), Pl. App., Item 30.

or assume the powers of the Pecos River Commission." . . . We disagree. 462 U.S. at 566-67 (footnote added).

In the course of its emphatic response to New Mexico's position, the Court stated the following:

> Considerations outside the Compact itself also render New Mexico's theory of the role of this Court untenable. According to New Mexico, Texas may seek judicial review in this Court of decisions actually made by the Commission—presumably on the votes of both State's Commissioners. That is not the proper function of our original jurisdiction to decide controversies between two States. In recent years, we have consistently interpreted 28 U.S.C. § 1251(a) as providing us with substantial discretion to make case-by-case judgments as to the practical necessity of an original forum in this Court for particular disputes within our constitutional original jurisdiction. . . . . We exercise that discretion with an eye to promoting the most effective functioning of this Court within the overall federal system . . . . *If authorized representatives of the compacting States have reached an agreement within the scope of their congressionally ratified powers, recourse to this Court when one State has second thoughts is hardly "necessary for the State's protection," Massachusetts v. Missouri*, 308 U.S. 1, 18 (1939). Absent extraordinary cause, we shall not review the Pecos River Commission's actions without a more precise mandate from Congress than either the Compact or 28 U.S.C. § 1251 provides. 462 U.S. 554, 570-71 (1983) (emphasis added; footnote and citations omitted).

In a footnote to this passage, the Court said, in part:

> *When it is able to act, the Commission is a completely adequate means for vindicating either State's interests.* The need for burdensome original jurisdiction litigation, which prevents this Court from attending to its appellate docket, would seem slight. *Id.* at 571 n. 18 (emphasis added).

Here, the authorized representatives of the compacting states (the Colorado and Kansas Compact Administration members) have reached an agreement (the Operating Principles) within the scope of their congressionally ratified powers (to implement and prescribe procedures under Article VIII-B). Therefore, recourse to this Court by Colorado is hardly necessary for Colorado's protection. In this action, Colorado has not requested that the Court review the action of the Compact Administration adopting the Operating Principles, let alone shown "extraordinary cause" for granting such a request. Further, the Court has held that when the Compact Administration is able to act, as occurred in its adoption of the Operating Principles, the Administration is a completely adequate means for vindicating Colorado's interest, and resort to this Court's original jurisdiction on the subject of the agreement, namely, the Operating Principles, is not needed.

Article VIII-A of the Compact creates the Compact Administration and Article VIII-B empowers the Compact Administration to adopt regulations, prescribe procedures and perform all functions required to implement the Compact. Article VIII also provides for the membership of the Compact Administration: water right owners from specified areas within the basin and the chief water officials of each state. In addition, considerable expertise is made available to the Administration through the water agencies of the two states and the federal government. The Compact Administration is clearly invested with considerable access to technical expertise in making decisions such as the one it made on June 6, 1967, when it adopted the Operating Principles.

The Master decided that "the Compact Administration did not do, nor intend to do, what Kansas now claims." Rep., vol. III, at

414. He further stated, "I find nothing to indicate that the Compact representatives of either State thought they were exercising binding authority under Article VIII-B." *Id.*, at 415. The Master appears to rest this conclusion on the fact that the Bureau of Reclamation was the body which developed the Operating Principles and that the Operating Principles had been widely accepted by other parties prior to being voted on by the Compact Administration. *See id.*, at 414. He also seems to have based it on the approval of the Governor of Kansas subject to the acceptance of the Operating Principles by the Compact Administration, and the fact that the primary subject of discussion at the meeting at which they were adopted was the set of additional conditions requested by Kansas. *Id.*, at 414-15. These are odd grounds to cite as a basis for determining the intentions behind governmental action. The primary source for determining the Compact Administration's intent should be the terms of the promulgation itself. *See, e.g., Negonsott v. Samuels*, 113 S. Ct. 1119, 1122-23 (1993), *Reeves v. Ernst & Young*, 113 S. Ct. 1163, 1169 (1993).

The Operating Principles themselves refute the Master's conclusion. The first sentence of the document provides as follows:

> The Trinidad Dam and Reservoir Project as reported in House Document No. 325, 84th Congress, 2d Session, and as authorized by the Flood Control Act of 1958, will be operated in such a manner as to secure the greatest practicable benefits from the regulation and use of the flows of the Purgatoire River consistent with the laws and policies of the State of Colorado and of the United States including the Arkansas River Compact. Jt. Ex. 19, June 6, 1967 minutes (R. vol. 17, 87, 89), Pl. App., Item 12, at A-52 to -53.

These are clearly mandatory words—"The Project . . . will be operated in such a manner. . . ." These are not words of mere courtesy or advice. These words show an intent on the part of the governmental body adopting them that they are mandatory

and expected to be enforceable. The substantive provisions are expressed in the same imperative language. For example, Article III on Flood Control provides, in pertinent part, as follows:

> Trinidad Reservoir shall be operated for flood control benefits in accordance with regulations prescribed by the Secretary of the Army and the following operating principles:
>
> 1. All potentially damaging flood inflows shall . . . .
> 2. All flood waters stored in the flood control capacity shall . . . .
> 3. Any inflow, other than that stored for irrigation use, temporarily retained below the bottom of the flood control capacity for flood control purposes shall . . . . *Id.*, at A-56 (emphasis deleted).

Article IV-Irrigation is no less mandatory:

> Administration of the irrigation capacity in Trinidad Reservoir and the distribution of water to the District Irrigable Area will be made by the District in accordance with House Document No. 325, 84th Congress, 2d Session, and these operating principles. . . .
>
> A. . . .
>
> 1. The water users within the District shall assign . . . .
>
> 2. Waters of the Purgatoire River shall be stored . . . .
>
> B. . . .
>
> 1. The acreage irrigated by the District water supply shall be limited . . . .
> 2. All water deliveries to the 19,717 acres of the District irrigable area will be limited . . . .

> 3. No water deliveries for irrigation of the 19,717 acres of the District irrigable area will be made . . . . *Id.*, at A-56 to -59 (emphasis deleted).

This listing of mandatory terms could be continued through every operative provision of the Operating Principles. Thus, the strongest evidence, the document itself, consists entirely of terms that are not merely directory or advisory, but mandatory, showing a self-conscious exercise of binding authority by the Compact Administration.

The sources to which the Master resorted to support his conclusion are unpersuasive. The fact that the wording was not generated within the Compact Administration itself is not persuasive. Governmental entities borrow language from documents and enactments generated by other governmental bodies. The sharing of such ideas is common in the federal system. The rules of civil procedure of the federal and state judiciaries are an immediate example. The enactment of uniform laws among the states is a manifestation of another kind of intergovernmental sharing of statutory provisions. No one suggests that the promulgation of such provisions is any less binding because of the source of the language in those provisions. Nor are they denigrated on the basis that other governmental entities have accepted those same provisions.

The Master also refers to the "prior" approval of the Governor of Kansas. However, it is clear that the approval of the Governor of Kansas was contingent upon the acceptance of the Operating Principles by the Compact Administration. *See* Jt. Ex. 45 (R. vol. 17, at 86, 89), Pl. App., Item 17. If the adoption of the Operating Principles by the Compact Administration was a useless act as the Master suggested, there would have been no reason for the Governor of Kansas to insist upon that act. Prior approval by other governmental entities would not be expected to deprive a subsequently acting governmental entity of the intent expressed in the enactment itself.

The Master also seemed to take comfort from his assertion that the primary subject of discussion at the Compact Administration meeting at which the Operating Principles were adopted was the inclusion of the five additional Kansas conditions. This is contrary, however, to the suggestion of the chief Colorado representative on the Compact Administration when he introduced the issue: "Mr. Sparks was asked to present the Trinidad Project for consideration. He said the project had been before the Administration for a long time and he asked if Kansas had any further questions on the project." Jt. Ex. 19, June 6, 1967 minutes (R. vol. 17, at 87, 89), Pl. App., Item 12, at A-50. The fact that the project had been before the Administration for a long time belies the Master's suggestion that the only thing of interest to the Administration was the set of additional Kansas conditions. Those were simply the last addition to the Operating Principles and therefore a natural subject of discussion. The reference to the possibility of "further questions" from Kansas also suggests previous discussions, whether on or off the record, concerning the project. Indeed, the issue of the Trinidad Project, operating principles and the appropriate form of Commission action had been before the Compact Administration for many years. *See* Rep., vol. III, at 386-87; Jt. Ex. 34, ¶ 144, at 40 (R. vol. 17, at 77, 89), Pl. App., Item 14.

This Court drew a strong distinction in *Texas v. New Mexico* between review of a compact commission's decision where there had been affirmative and unanimous action by the commission and the absence of commission action. *See* 462 U.S. at 566-71. The Court continued this distinction more recently in *Oklahoma v. New Mexico*, 501 U.S. 221 (1991). There the Court rejected a Master's recommendation to remand to the Canadian River Commission a question which had not already been determined by a unanimous decision of the commission. The Court rejected the recommendation saying that "this Court must pass upon every question essential" to a determination of a controversy between the states. 501 U.S. at 241. Here, however, adoption of the Trinidad Reservoir Operating Principles constitutes a prior and unan-

imous decision of the Compact Administration, so the very predicate of the Court's ruling in *Oklahoma v. New Mexico* is lacking.

C. Kansas and Other States Need To Be Able To Rely on Unanimous Actions of Interstate Compact Agencies.

The question involved here is one of principle that will determine for the indefinite future whether Kansas can rely on resolutions of the Arkansas River Compact Administration relating to details of compliance with the Arkansas River Compact. The direction that Kansas receives from the Court will also serve as a guide to other states and other interstate compact commissions and administrations.

The language of the Compact indicates that the states generally should implement the Compact through joint action of the Arkansas River Compact Administration. *See* Compact Art. VIII, Rep., App., Ex. 1, at App. 11-15. Certainly there is no indication that violations could be shown and resolved only by resort to the original jurisdiction of this Court.

As a practical matter, if the compacting states cannot rely on unanimous resolutions of the interstate compact agency charged with implementing a compact, such as resolutions setting standards for operation of new facilities to insure compliance with a compact, the willingness of compacting states to agree to such resolutions will be reduced. As the Master recognized, this federal project would not have been funded by Congress absent the concurrence of Kansas. Rep., vol. III, at 431. Moreover, the U.S. Bureau of Reclamation assured Kansas that the Operating Principles would implement the Arkansas River Compact and would be strictly complied with. *See* Jt. Ex. 44, at 1 (R. vol. 17, at 82, 89), Pl. App., Item 16. In order for useful projects to be considered in the future, therefore, at least where they involve federal resources or property, the concurrence of the downstream state is necessary. If such cooperation is to be forthcoming, the downstream state will need to be able to rely on commitments by the upstream state. The Master's decision would thwart that process.

D. Enforcement of the Operating Principles Will Not Modify the Compact.

An interstate compact adopted under Article I, Section 10, Clause 3 of the United States Constitution cannot be changed by the interstate agency created by the compact. *See, e.g., Texas v. New Mexico*, 462 U.S. 554, 564-65 (1983). The Master's primary concern in denying the Kansas claim was that the Compact not be altered through the actions of the Compact Administration. *See* Rep., vol. III, at 421.

The Master's concern is unjustified. The Operating Principles were proposed by the U.S. Bureau of Reclamation and adopted by the Arkansas River Compact Administration in the belief that they were necessary to implement and prevent violation of the Arkansas River Compact, particularly Article IV-D. *See* Jt. Ex. 44, at 1 (R. vol. 17, at 82, 89), Pl. App., Item 16. The Master agreed that the Operating Principles were expected to provide protection against material depletion of usable flow under Article IV-D. Rep., vol. III, at 425-26. Far from altering the Compact, the Operating Principles carry out the intent of the Compact and ensure compliance with it.

The Master assumed that enforcement of the Operating Principles would bestow benefits on Kansas, contrary to the purposes of the Trinidad Project. Rep., vol. III, at 424-25. The only evidence, however, that might be thought to support such a conclusion was the 1988 study by the Bureau of Reclamation of the 1925-57 period. *See* Rep., vol. III, at 401; Jt. Ex. 23, at 28-29 (R. vol. 17, at 69, R. vol. 18, at 21, 22), Pl. App., Item 13. The Bureau itself never drew such a conclusion. The 1925-57 period is not the period of operation (1979-84). When Colorado analyzed the Winter Water Storage Program by similarly analyzing a period when the Program was not in operation, the Master rejected the evidence. *See* Rep., vol. II, at 317-18. There the Master recognized that the period of analysis can make a significant difference in the effect of the program because of differing hydrologic and

institutional conditions. *See* Rep., vol. II, at 318.[10] The same conclusion is applicable to selection of a suitable study period to analyze the Operating Principles. The suitable period is obviously the only period of operation, 1979-84. No such analysis has been performed. Therefore, the Master's conclusion is of doubtful validity.

II. Colorado's Winter Water Storage Program Has Violated the Arkansas River Compact.

A. Introduction.

The Master recommended that Kansas' WWSP claim be denied because (1) it is too uncertain and (2) accretions might offset depletions. Rep., vol. II, at 329-35. For several reasons, the WWSP claim should not be rejected. The Kansas experts determined there was a violation in the amount of 40,000 acre-feet of depletions to usable flow during the operation of the program (1976-85). Pl. Ex. 111"" (R. vol. 89, at 9, 85, vol. 99, at 5), Rep., App., Ex. 11. No other evidence of depletions or lack thereof was submitted for the 1976-85 period of operation. Colorado analyzed a different period, when the program was not operating. Rep., vol. II, at 317. Yet even with several favorable assumptions, Colorado also found depletions of total flow, in excess of 9,000 acre-

[10] The Master sought to justify his use of averages to assess the Bureau of Reclamation's study results on the basis that Kansas did not object to the use of averages to evaluate the 1961-64 Bureau of Reclamation studies. Rep., vol. III, at 426-28. On the one hand, he said that Colorado is not bound by the Operating Principles; on the other, he said that Kansas is bound by references to averages that do not even appear in the Operating Principles. *See id.*; Operating Principles, Pl. App., Item 19. Moreover, there is little logic in the Master's position that use of averages to determine whether to adopt the Operating Principles dictates that departures from the Operating Principles should also be quantified using averages, especially in light of the denigration of averages in *Colorado v. Kansas*, 320 U.S. 383, 396-97 (1943) and the emphasis in Article IV-D on "availability for use."

feet. *Id.*, at 318. The Master rejected the evidence of depletions, however, holding that the results are too uncertain, placing the onus of uncertainty on Kansas, yet it was Colorado that obtained the benefits of the WWSP; it was Colorado that unilaterally initiated the WWSP without the benefit of prior sufficient studies and data collection now found necessary by the Master. Rep. vol. II, at 334-35. Kansas should not be penalized for a situation created by Colorado and from which only Colorado received benefits.

The Winter Water Storage Program has been operating in Colorado since 1976, a period of approximately 18 years. *Id.*, at 309. The period of operation for which evidence is before the Court is 1976-85 (except 1978—a year in which the program did not operate). *Id.* Common sense leads to the conclusion that putting water on the fields in the heat of summer results in more evaporation and other losses than irrigating fields without crops in the cold of winter. Indeed, the hydrologic modeling performed both by Kansas and Colorado shows that the WWSP causes depletions under widely varying hydrologic conditions. *See id.*, at 316, 318. The Kansas evidence indicates that during the nine years of the WWSP's operation, the program caused depletions at the state line of 53,000 acre-feet, of which 40,000 were usable under-Kansas' usable flow method. Pl. Ex. 111"" (R. vol. 89, at 9, 85, vol. 99, at 5), Rep. App., Ex. 11.[11] Colorado, simulating the WWSP in that part of the study period in which the WWSP did not operate (1950-75 and 1978), also found depletions, as described below. The United States took two positions. *See* Rep., vol. II, at 318-22. The Bureau of Reclamation official called by the United States testified that he believed the program did comply with the Compact. Rep., vol. II, at 320-21. On the other hand, the expert witnesses called by the United States took the position

[11] Under the usable flow method accepted by the Master, the corresponding usable depletions for the period 1976-85 are 27,000 acre-feet. Rep., vol. II, at 316 n.134.

that it was impossible to determine whether or not the program complied with the Compact. *See* Rep., App., Ex. 9, at App. 103.

Given this state of the evidence, the Master attempted to apply the preponderance of the evidence test. Rep., vol. II, at 335. In effect, he said that it was more likely than not that there were no material depletions of usable flow as a result of the WWSP. Despite sizeable depletions determined by the Kansas model (53,000 acre-feet) and smaller but not immaterial depletions under different hydrologic conditions determined by the Colorado model, the Master in effect found it was still more likely that there were no depletions at all. This is an inherently implausible result.

B. The Master Erred in Placing the Risk of Uncertainty Resulting From Lack of Data on Kansas.

With regard to the WWSP, the Master concluded "that the depletions shown by the Kansas model are well within the model's range of error." Rep. at 334-35. The Master mistakenly assumed that this fact rendered the claim negligible. The depletions calculated by the Kansas model caused by the Colorado Winter Water Storage Program are 53,000 acre-feet. Pl. Ex. 111*** (R. vol. 89, at 9, 85, vol. 99, at 5); Rep., App., Ex. 11, at App. 118. The range of error associated with the figure 53,000 acre-feet is very difficult to quantify, and no one has attempted to do so.[12] R. vol. 127 at 117-19, Pl. App., Item 28. During cross-examination, the lead Kansas expert was asked to estimate the range of error. He estimated it to be less than ± 50%. R. vol. 128, at 107-08, Pl. App., Item 29. If it were as much as ± 50%, the range of error would be 53,000 ± 26,500 acre-feet. A depletion of 26,500 is

[12] The uncertainty quantified in the Report is not the uncertainty of calculated depletions. The Report quotes evidence of uncertainty in the prediction of stateline flows, a very different quantity. Rep., vol. II, at 323-25; R. vol. 127, at 117-19, Pl. App., Item 28. It amounts to a precise answer to the wrong question. The evidence simply does not support the finding that 53,000 acre-feet is within the uncertainty of the model.

certainly material, and 79,500 acre-feet is obviously even more so.[13]

None of the experts deny that there is uncertainty with respect to the modeling results of either state. Much of the source of the uncertainty in the WWSP analysis is the lack of adequate data. R. vol. 127, at 118-19, Pl. App., Item 28. The risk of the lack of adequate data should be borne by the state that initiates and benefits from post-Compact development without collecting the data within its jurisdiction or doing the studies needed to support a good faith belief that the development will comply with the Compact.

The Master effectively held in favor of Colorado, the upstream state that initiated the WWSP without sufficient studies, the state that benefitted from this development, and the state that had effective control over the collection of data. He placed the risk of uncertainty in the modeling results, which was caused by the lack of data, squarely on Kansas, the downstream state. *See* Rep., vol. II, at 329-35. Yet Colorado proceeded with the WWSP without collecting the data or doing the studies needed to support a good faith belief that this development would comply with the Compact.[14] And Colorado, as a practical matter, has had control over (1) existing data in Colorado and (2) the determination whether to collect additional data that may be needed. Colorado literally controls the amount of data available. It is sovereign within its borders, and while the Arkansas River Compact allows for cooperative gathering of data relevant to the Compact (*see* Art. VIII), no Administration action can be taken without the concurrence of Colorado. *See id.*

Kansas has presented evidence based on the best data available. Rep., vol. II at 250. It has relied upon some of the best experts available (*Id.*, at 232), yet because of Colorado's lack of data collection during the study period, Kansas has been blocked by the

[13] These values would be reduced to usable amounts by the appropriate usable flow method.

[14] Cf. Rep., vol. II, at 321-22.

Master on the basis that there is too much uncertainty in its evidence.

This Court recommended in *Colorado v. Kansas* and other equitable apportionment cases that the states solve their differences by compact. It is not consistent with that policy to allow one state to take unilateral action to the detriment of the other compacting state. To allow Colorado to fail to collect data, to "hide in the noise" of the existing and inadequate data (*see* Rep., App., Ex. 9, at App. 103), to initiate and to benefit from, a post-Compact development, and then to deny Kansas protection under the Compact because modeling results are made uncertain by the same lack of data, emasculates Article IV-D of the Compact. Such a ruling encourages states to initiate post-Compact developments without definitively testing compact compliance and discourages the collection of data that would help determine compact compliance.

The placement of the burden of proof is a matter of public policy and substantive law. *American Dredging Co. v. Miller*, 114 S. Ct. 981, 988 (1994). The public policy in this case should not reward the state that proceeds without adequate prior studies, that benefits from the project and that controls the data necessary for the determination of compact compliance by placing the whole burden on the downstream state. Rather, even if the ultimate burden of persuasion is on the plaintiff state, it would be fundamentally unfair also to place on the plaintiff state the burden of production of data from the defendant state.

Colorado also independently analyzed the WWSP claim with its hydrologic model, and it also found depletions. Rep., vol. II, at 318. Although it analyzed the wrong period, namely the period during which the WWSP was not operating, it found during that period that the WWSP would have caused depletions in excess of 9,000 acre-feet. *Id.*[15] And this is in spite of the fact that it made important assumptions in its own favor.[16] Thus, both Kansas

[15] The 9,000 acre-foot figure represents simple depletions at the state line as opposed to usable depletions. *Id.*

[16] Colorado assumed (1) no effect from the WWSP between Pueblo and Las Animas, a stretch of more than 100 river miles in the heart of the WWSP area, *id.*, at 317, n. 136, vol. I, Map in pocket; (2) accretions can be offset by Colorado against depletions no matter when they occur during the 27-year period, *see* Def. Ex. 134*, at 8.1 (R. vol. 83, at 71, vol. 86, at 160, vol. 115, at 97), Pl. App., Item 6; and (3) high winter evaporation, which tends to minimize the difference between winter and summer evaporation, and thus the calculated effect of the WWSP. *See* Rep., vol. II, at 317 n. 136.

and Colorado have determined that the Winter Water Storage Program creates depletions not only when analyzed for the period in which it actually operated but also hypothetically in the other years of the study period in which it did not operate. Common sense and all available evidence indicate that the WWSP causes depletions.

In *Commercial Molasses Corp. v. New York Tank Barge Corp.*, 314 U.S. 104, 111 (1941), this Court noted that the burden of proof, which is synonymous with the burden of persuasion, is usually placed on the party with the better opportunity to know the fact in issue. While *Commercial Molasses* involved a bailment, the principle is not confined to that area of law. *See* 9 John H. Wigmore, *Evidence* §§ 2487-89 (Chadbourn rev. 1981). Here the Master's rejection of Kansas' WWSP claim places on Kansas not only the burden of persuasion but also the burden of coming forward with evidence.[17] The Master's approach ignored the fact that the data were accessible to Colorado, but not to Kansas. In comparable circumstances, the law has placed the burden of coming forward with evidence on the party with access to data. *See e.g., Ybarra v. Spangard*, 25 Cal.2d 486, 154 P.2d 687, 689 (1944). As this Court has noted: "The ordinary rule, based on considerations of fairness, does not place the burden upon a litigant of establishing facts peculiarly within the knowledge of his adversary." *United States v. New York, N.H. & H. R.R.*, 355 U.S. 253, 256 n.5 (1957). The concepts of fairness noted in these cases

[17] For the most recent discussion of the difference between these burdens, see *Office of Workers' Compensation Programs v. Greenwich Collieries*, 114 S.Ct. 2251, 2255-56 (1994).

compel the conclusion that, when all available data indicate depletions, the state that has control over data and that initiates a program should be the state that bears the burden of producing evidence to reduce uncertainty. The Master not only required Kansas to present a prima facie case but also relieved Colorado of the burden of coming forward with evidence to reduce assumed uncertainty in the Kansas evidence of depletions. He placed the burden of reducing uncertainty on Kansas, the party least able to carry that burden. This Court should reject that approach.

Here, the uncertainty perceived by the Master is the only bar to Kansas' satisfying its burden, other than the possibility of offsetting by accretions, discussed below. The Kansas model calculated depletions of 53,000 acre-feet, which the Kansas experts testified was their best estimate given the data limitations. Rep., vol. II, at 250; Pl. Ex. 111[18] (R. vol. 89, at 9, 85, vol. 99, at 5), Rep. App., Ex. 11; R. vol. 127, at 118-19, Pl. App., Item 28. Even the attempts by the Colorado expert to alter the Kansas model to eliminate calculated depletions did not succeed. *See* Def. Ex. 1011, Comparison 4 (R. vol 133, at 61, vol. 139 at 44, 83), Pl. App., Item 7; Def. Ex. 1012, Comparison 4 (R. vol. 138, at 65, vol. 139, at 44, 83), Pl. App., Item 8.[18]

When the evidence presented by the two states is fully considered, together with the results of the work by the Colorado expert to alter the Kansas model more to his liking, it is striking that WWSP depletions just will not go away. Neither will the uncertainty in the exact quantification go away. Kansas is entitled to protection under the Compact. Any uncertainty it could do nothing about and which resulted from the unilateral action of Colorado only increases the need for protection.

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[18] The Colorado expert did not propose his results as independently reliable quantifications of depletions caused by the WWSP, but only as preferable in his opinion if the Kansas model were accepted. Rep., vol. II, at 288-89.

C. The Master Relied on a Basis as to Which the Record Was Admittedly Incomplete.

The Master based his decision to reject Kansas' Winter Water Storage Program claim on the proposition that if accretions were taken into account, then depletions would be essentially eliminated.[19] Rep., vol. II, at 335. The Master should not have relied on evidence of accretions to defeat Kansas' WWSP claim. Earlier in his Report, he examined the question of accretions and determined that the "issue needs to be examined." Rep., vol. II, at 263. He went on to say, "[I]f my conclusion on liability is confirmed by the Supreme Court, then, to refine the total amount of depletions, additional evidence will be required during the remedies phase of the trial." *Id.* Nevertheless, when the Master arrived at the question of whether the evidence showed that Colorado violated the Compact by operation of the WWSP, without waiting for the evidence that he had indicated was necessary, he rejected the Kansas claim in part on the basis of accretions. *See* Rep., vol. II, at 335. This is inconsistent with simple fairness; it is inconsistent with the precedents of this Court and it is inconsistent with the need the Master expressed for further evidence on accretions. At the very least,[20] the conclusion as to whether Kansas established its WWSP claim should have awaited a determination of the status of accretions. The Master himself stated:

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[19] "Accretions" are calculated increases in monthly stateline flows from the amount of water that would have flowed across the stateline absent the institutional change in Colorado.

[20] Kansas contends that offsetting monthly accretions against monthly depletions is contrary to the Article IV-D proviso that the waters of the river "not be materially depleted in usable quantity or availability for use . . . ." There is no evidence that would support the Master's suggestion that accretions can be used to offset the depletions forbidden by Article IV-D. Unlike the Rio Grande Compact of ten years earlier, Act of May 31, 1939, ch. 155, 53 Stat. 785, the Arkansas River Compact contains no provision for debits and credits. Cf. *id.*, at Art. VI. The Master reserved his ruling on this issue. Rep., vol. II, at 263.

> Kansas properly seeks protection against an averaging process that would allow depletions to be offset by later accretions that might not be usable because of amount or timing, or might simply come too late to compensate for earlier injury. Article IV-D of the compact addresses not only quantity but also protects the "availability for use" of Stateline flows. Rep., vol. II, at 262.

It is inconsistent with his stated position on the propriety of protecting Kansas from having accretions offset against depletions in other months, as stated above, to rely on the calculation of accretions to defeat the Kansas WWSP claim. The Master stated that "depletions are essentially eliminated if accretions are taken into account." Rep., vol. II, at 335. It is erroneous to rely on accretions when the Master has stated that additional evidence is necessary in order to determine when accretions may be offset against depletions, if at all, and when they may not.

The Master's reliance on accretions to defeat the Kansas WWSP claim is inconsistent with this Court's holding in *United States v. Texas*, 339 U.S. 707 (1950). In that case, there was no dissent from the following statement in the majority opinion: "The Court in original actions, passing as it does on controversies between sovereigns which involve issues of high public importance, has always been liberal in allowing full development of the facts." 339 U.S. at 715. Here we have a situation in which the Master has declared in no uncertain terms that more evidence is needed on remand with regard to the status of accretions. In the same Report, however, he seeks to support his final conclusion with respect to the Kansas WWSP claim by relying on the very same accretions. Such reliance would not be appropriate in the normal case, and it is even less appropriate in a case between sovereigns where this Court has specifically indicated the need for full development of the facts before making a decision.

III. Kansas' Method for Determining the Usability of Depletions is the Only Proposed Method Consistent With the Compact.

A. Introduction.

Article IV-D of the Compact prohibits material depletions "in usable quantity or availability for use." Thus, depletions from post-Compact developments calculated by the experts of the parties must be analyzed to determine how much of the depletions are usable. The foregoing language of Article IV-D, understood with the help of the prior decision of this Court, requires a daily analysis of usability if at all possible. Yet the Master chose the opposite — a usability analysis which depends on long-term averages and pays no heed to the availability-for-use criterion. Moreover, because of the hydrologic conditions present during one part (1975-82) of the study period (1950-85), the method chosen by the Master underestimates usable depletions to Kansas water users by 124,000 acre-feet. *See* Rep., vol. II, at 303; Pl. Ex. 698[21] (R. vol. 127, at 127, 146), Pl. App., Item 5.

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[21] Plaintiff's Exhibit 698 is Item 5 in the Appendix. This bar graph is a comparison of the two methods for determining usability under discussion. In red is shown the method proposed by Kansas (SWE method). In purple is shown the method adopted by the Master (HCI method with Larson coefficients). This graph shows *cumulative* usable stateline depletions. Thus, the amount shown for each year is not the amount of usable depletions in that year by each method. Rather, the amount shown for each year is the accumulated usable depletions from the beginning of the study period in 1950 up to that year, all added together. The graph shows that the methods are quite comparable until about 1975, when they begin to diverge, the red bars representing the method proposed by Kansas increasing at a higher rate than the purple bars representing the method adopted by the Master. However, the cumulative difference between the two methods stops changing in 1982. In other words, the difference that has been built up between 1975 and 1982 is not increased further in the later years. That difference simply remains constant, which means that the two methods are calculating comparable amounts of usable depletions in each of those later years.

Kansas proposed the most appropriate method for determining the usability of depletions caused by post-Compact developments in Colorado. This method takes into account conditions in Kansas on a daily basis throughout the study period. Rep., vol. II, at 301-02. These conditions include the river flow at the state line and downstream in Kansas to Garden City, precipitation in Kansas, and whether the ditches in Kansas are diverting essentially all of the flow available to them. *See* R. vol. 89, at 40-50, Pl. App., Item 24. A determination is then made for each day of the study period whether all of the flow at the state line is being used in Kansas either for diversion or groundwater recharge. *Id.* If essentially all of the water flowing across the state line is being used on a certain day, and there is more capacity to use additional water if it is available, then that is a day on which additional flows are assumed to be usable. *Id.* When this analysis is done for a complete month, the percentage of days on which additional flow was determined to be usable is assigned to that month. *Id.* The percentage thus determined is multiplied against the depletions calculated by the Kansas model[22] for that same month.

Colorado also proposed a usable flow method that avoided averaging for periods longer than a month. Rep., vol. II, at 296. It applied its usable flow method in conjunction with the monthly output of its model. *Id.*

Another usable flow methodology is relevant in this context. C.L. Patterson was Chief Engineer for the Colorado Water Conservation Board and one of Colorado's original Compact Com-

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Thus, this Exhibit graphically shows that the two methods are very comparable both before 1975 and after 1982, indicating that it is only the extreme drought conditions present in the years 1975 to 1982 that cause the two methods to diverge with regard to their results. Thus, the reason for the divergence is the undisputed coincidence of high depletions and high usability in those years and not other alleged defects in the method proposed by Kansas.

[22] The Kansas model as used in this Brief is the Kansas Hydrologic-Institutional Model (H-I Model) used to quantify depletions at the state line as a result of post-Compact development in Colorado.

missioners charged with drafting the Compact. Rep., vol. I, at 78, 91. With the approval of the Colorado Attorney General and State Engineer, in February 1944, Mr. Patterson developed a quantitative method for determining usability based on the December 1943 decision of this Court. Jt. Ex. 8, at 23-24 (R. vol. 4, at 141, 142), *reprinted in* Rep., vol. II, at 292. Mr. Patterson's method was sensitive to daily variations in flow as recommended by this Court. *See id.* It limits usable flows to the instantaneous capacity of the Kansas ditches (2,000 cubic feet per second). *Id.* It also has volumetric limits for each month and for each season.[23] *Id.*

The Master's method[24] is based on calculations of average diversions as a percentage of stateline flows and average recharge over long periods of time, 36 years with respect to diversions (1950-85) and 23 years with respect to groundwater recharge (1925-48). *See* Rep., vol. II, at 293-95, 305. The Master's method assumes that 82% of all summer flows and 35% of all winter flows are usable either as surface diversions or as groundwater recharge. *See id.* These percentages are the same year after year from 1950 through 1985. Thus, a portion of the depletions (18% in the summer and 65% in the winter) is *always* considered to be unusable in Kansas regardless of actual conditions.

B. The Master's Averaging Method is Inconsistent with Article IV-D.

The proviso of Article IV-D of the Compact states as follows:

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[23] The percentage of flows determined to be usable each month under both Kansas' method and the Patterson method is given in Pl. Ex. 646 (R. vol. 89, at 62, 85, vol. 99, at 106), Pl. App., Item 4.

[24] In the Report the method proposed by Kansas for approval ultimately by the Court is referred to as the "Spronk Approach" (or "SWE Method"). The method adopted by the Master is referred to in the Report as the "Durbin Approach" (or "HCI method") with "the Larson Modifications." The method proposed by Colorado is referred to as the "Helton Approach." *See* Rep., vol. II, at 293-305.

> Provided, that the waters of the Arkansas River, as defined in Article III, *shall not be materially depleted in usable quantity or availability for use* to the water users in Colorado and Kansas under this Compact . . . . (Emphasis added.)

The plain meaning of the words emphasized above excludes the notion of averaging over multi-year periods and requires consideration of hydrologic variability as it affects supply and demand. The words "in usable quantity or availability" also echo the words of this Court in the 1943 decision in *Colorado v. Kansas*, 320 U.S. 383 at 396-97 as quoted in the Master's Report:

> "The Kansas ditches are capable of diverting water only up to 2,000 c.f.s. When the flow is greater the excess cannot be diverted and used. It is admitted that the character of the flow of the river in Colorado is variable from year to year, from season to season, and from day to day, and the main river below Canon City may be almost without water one day, run a flood the next day, and, on the following day, be in practically its original condition. Thus it appears that both in Colorado and in Kansas there may at one time be flood water unavailable for direct diversion and, at another, not enough water to supply the capacity of diversion ditches. *The critical matter is the amount of divertible flow at times when water is most needed for irrigation. Calculations of average annual flow, which include flood flows, are, therefore, not helpful in ascertaining the dependable supply of water usable for irrigation*". (Emphasis added.) Rep., vol. II, at 291-92 (emphasis in the Report).

Nor was the need to avoid averages to the maximum extent possible lost on the negotiators of the Compact, many of whom were

involved in the Supreme Court case. As a result, Article II of the Compact specifically provides:

> The provisions of this Compact are based on . . . (2) the opinion of the United States Supreme Court entered December 6, 1943, in the case of *Colorado v. Kansas* (320 U.S. 383) concerning the relative rights of the respective States in and to the use of waters of the Arkansas River. . . .

The drafters of the Compact then proceeded to require that the waters of the Arkansas River not be "materially depleted in *usable quantity or availability*," emphasizing the need to observe the usability and availability of waters to the maximum extent possible in line with the insights of the 1943 Supreme Court opinion.

Thus, this Court and the compacting states have recognized the need to assess the usability of flows on a daily basis to the maximum extent possible. Long-term averages were considered "unhelpful" by this Court in 1943 and are inconsistent with Article IV-D of the Compact. And as the Master himself recognized, in parts of the Report other than that quoted above, usable flow averages are not acceptable under the Compact. *See* Rep., vol. I, at 52, vol. II, at 262.

While the Master obviously recognized the shortcomings involved in relying on averages in general, and the mandate from this Court and the Compact itself to avoid such reliance, he chose a method of analyzing usability that relies not just on averages, but long-term averages. The quotation from the opinion of the Court in *Colorado v. Kansas* makes clear that usability varies on a daily basis in the Arkansas River Valley. To accept the Master's approach is tantamount to reading the language "in usable quantity or availability" out of the Compact. Nevertheless, the Master recommended that the Kansas daily analysis of usability be rejected in favor of a method that assesses usability based on averages spanning decades.

The Master's method does not recognize daily variations in usability. *See* Rep., vol. II, at 293-95, 305. It does not even recognize monthly variations or even variations over a full season. *Id.* In fact, it assumes that every irrigation season is like every other irrigation season in the whole 36-year study period. *Id.* It also assumes that every winter season is exactly the same as every other winter season, allowing no variability from year to year, let alone day to day. *Id.* Kansas' method is the only method proposed to the Master which accounts for the kind of variability that was contemplated by the Supreme Court, by the Patterson method and by Article IV-D of the Compact. Further, compared to the Patterson method, Kansas' method is generally lower in its quantification of usability. In fact, the Patterson method yields higher usable flows than Kansas' method in most months. *See* Pl. Ex. 646 (R. vol. 89, at 62, 85, vol. 99, at 106), Pl. App., Item 4.

The Master suggested that Kansas' method produces the greatest amount of depletions of usable flow, by comparing it to the results of the method he ultimately adopted. *See* Rep., vol. II, at 302-03. But Kansas' method always yields lower usable flows than the Patterson method, which was proposed by Colorado shortly after the Supreme Court decision in *Colorado v. Kansas*, 320 U.S. 383 (1943).

C. Kansas' Daily Method is Consistent With Article IV-D.

Both Colorado and Kansas agree that depletions were generally highest during the late 1970s and early 1980s than at any other time during the 1950-85 study period. *See* R. vol. 127, at 120-21, 124, Pl. App., Item 28. The period of drought which occasioned the high pumping and therefore the high depletions of stateline flows also had the effect of increasing the usability of flows in Kansas dramatically. *Id.*, at 123-24. The chief Colorado expert agreed that the usability in Kansas was very high during the 1970s. *See* R. vol. 115 at 33, Pl. App., Item 26. The Kansas evidence for this period shows almost 100% usability. *See* Pl. Ex. 646 (R. vol. 89, at 62, 85, vol. 99, at 106), Pl. App., Item 4. This

was the only evidence specifically addressing this period (1975-82). The Master's choice of an averaging method led him to exclude some 124,000 acre-feet of depletions to usable flow based on the numbers presented by Kansas. *See* Rep., vol. II, at 303. The telling point here is that the averaging method and Kansas' method matched quite closely over more normal hydrologic periods. *Id.* Pl. Ex. 698 (R. vol. 127, at 127, 146), Pl. App., Item 5. The only part of the 1950-85 study period in which the Master's method and Kansas' method differ significantly is the 1975-82 drought period, which is the only part of the study period where high depletions and high usability coincided.

D. The Master Incorrectly Rejected Kansas' Method Based on Unsubstantiated Criticisms.

In the initial part of the trial before the Master, Colorado criticized the usable flow method adopted by the Master because it depended on long-term averages. *See* R. vol. 53 at 143-46, 148-49, Pl. App., Item 21. Colorado's own method varied from month to month. *See* Rep., vol. II, at 296. But Colorado has now developed arguments in an effort to support the long-term averaging method it earlier debunked.

Despite the characteristics of Kansas' method, which make it the only method consistent with Article IV-D, namely its recognition of daily changes in usability, the Master has rejected Kansas' method based on several arguments by Colorado. *See* Rep., vol. II, at 302-05. The first argument raised by Colorado that the Master accepted is that the Kansas model, which calculates the basic depletions at the state line, is itself based on "average data." *Id.* at 302. First, the argument itself is incorrect.[25] Second, Kansas is limited to the data collected in Colorado, the same data which were relied upon by Colorado when the institutional changes

[25] Although certain components of the Kansas model are based on averages, many important components, such as mainstem stream flows, are available and used in the model on a daily basis. R. vol. 54, at 122-23, 125, Pl. App., Item 22.

complained of by Kansas were initiated in Colorado. If the data are sufficient for Colorado to determine that those institutional changes can be undertaken without violating the Compact, that data should also be sufficient for analyzing compliance with the Compact after the fact. In other words, Colorado, not Kansas, should bear the risk of the lack of adequate (non-average) data, as explained more fully *supra* at 28-32. Moreover, the Colorado model is based just as much on average data as the Kansas model is, and Colorado had no hesitation applying its own usable flow method that varied on a monthly basis to the results of its model. Rep., vol. II, at 296. In addition, Colorado makes no claim that its model is more accurate than the Kansas model.

The Master impliedly criticized Kansas for proposing a method that gives a greater amount of depletion of usable flow than the method he chose. *See* Rep., vol. II, at 302-03. However, this is not generally true. The Master's statement is overbroad because it is only during the late 1970s and early 1980s, when high depletions coincided with high usability, that Kansas' method gives higher quantifications of depletions of usable flow than the method he chose. *See* Pl. Ex. 698 (R. vol. 127, at 127, 146), Pl. App., Item 5. In other periods, Kansas' method produces results that are very similar to those of the Master's averaging method. *Id.*

On the basis of arguments made by Colorado, the Master indicated that he believed that the Kansas usable flow method required the Kansas model to be "accurate" on a monthly basis. *See* Rep., vol. II, at 303. Although the Master adopted this factual assertion, Colorado never demonstrated any factual basis for it. The Master stated no factual basis (*see id.*), nor is Kansas aware of any. How uncertainty with regard to the calculated depletions at the state line makes more appropriate a method based on long-term averages is not explained. Several things are clear, however: (1) Any additional water that had come across the state line in the drought of the late 1970s would have been usable in Kansas for either diversion or groundwater recharge, R. vol. 127, at 123-24, 132-33, Pl. App., Item 28; (2) the Master's method does not

recognize that fact, *id.*; and (3) as a result, the Master underestimated the usable depletions for the period 1975-82, *id.*

The question of which usable flow analysis to use is not a question of the accuracy of the Kansas model. Rather, it is a question of the accuracy of the respective usable flow methods, that is, whether it is appropriate to select a usable flow method that ignores the undisputed coincidence of high depletions and high usability in the late 1970s and early 1980s just because the model calculations have uncertainty associated with them. *Id.* Unfounded requirements of accuracy for the Kansas model should not be allowed to defeat a usable flow method which is otherwise the method most compatible with Article IV-D's requirement that the waters of the Arkansas River not be depleted in "usable quantity or availability."

The final objection that the Master suggested in opposition to Kansas' method is that "Colorado's experts also criticized the Spronk usable flow analysis because it did not factor out increased losses in the Arkansas River in Kansas due to increased well development in Kansas in the 1970s. To the extent that well development in Kansas may have increased the amount of streamflow going to groundwater recharge, the point is valid." Rep., vol. II, at 304 (citations omitted). Colorado never established that this concern actually caused the method to give unreasonable results. It is simply a possibility. In fact, Colorado's counterclaim based on the same allegation of increased pumping, was dismissed by the Master for the reason that Colorado had not proved its case. Order Granting Kansas' Motion to Dismiss Colorado's Well Counterclaim. Rep., vol. III, at 447. However, the Master accepted a known shortcoming with the averaging method, namely, the undisputed underestimation of usable depletions in the late 1970s and early 1980s, in order to avoid the possibility of a problem with the better method which Colorado has alleged but has not been able to prove.

The sufficient answer to all criticisms proposed by Colorado and adopted by the Master regarding the usable flow method proposed by Kansas is the fact that outside the critical period of

1975 through 1982 the two methods are essentially the same. Pl. Ex. 698 (R. vol. 127, at 127, 146), Pl. App., Item 5. If the Master's criticisms were valid, the differences between the methods would be more general and would be visible both before and after the critical period. On the contrary, however, the methods are almost identical before 1975 and after 1982. If there is a problem in using Kansas' method because of the alleged monthly inaccuracy of the Kansas model, that same problem would create a difference between the results of the two methods in periods of normal or more normal hydrology. Yet nothing of the sort appears. If effects of increased post-Compact pumping in Kansas were affecting the validity of Kansas' method, this would continue to be the case after the end of the critical period, namely, in the years 1983 through 1985. However, nothing of the sort appears. If the fact that the Kansas model must rely in part on average data were making the use of the Kansas usable flow method inappropriate, the alleged inappropriateness would manifest itself in divergences between the two methods both before and after the critical period. Again, nothing of the sort appears.

CONCLUSION

On the basis of the foregoing, Kansas requests the Court to (1) deny Colorado's Motion to Dismiss Kansas' Trinidad Reservoir Claim and remand the issue to the Master with instructions that the test of Compact compliance is to be compliance with the Trinidad Dam and Reservoir Project Operating Principles adopted by the Arkansas River Compact Administration; (2) accept Kansas' claim that operation of the Colorado Winter Water Storage Program has violated Article IV-D of the Arkansas River Compact, or, in the alternative, remand this issue to the Master for consideration of the effects of accretions on the claim; (3) accept the Kansas usable flow method for purposes of determining compliance with Article IV-D of the Arkansas River Compact; and (4) in all other respects to adopt the Report of the Master.

Respectfully submitted,

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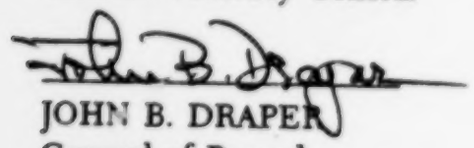

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APPENDIX

APPENDIX

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Item 14 Jt. Ex. 34, "House Document No. 325, 84th Cong., 2d Sess. (1956)" (excerpts) A-73

Item 15 Jt. Ex. 35, "Flood Control Act of 1958, 72 Stat. 297" (excerpt) A-79

Item 16 Jt. Ex. 44, "Letter dated February 1, 1967, from H.P. Dugan, Director, Region 7, U.S. Bureau of Reclamation, to Governor Robert Docking of Kansas" A-83

Item 17 Jt. Ex. 45, "Letter dated April 11, 1967, from Governor Robert Docking of Kansas to H.P. Dugan, Director, Region 7, U.S. Bureau of Reclamation" A-89

Item 18 Jt. Ex. 99, "U.S. Army Corps of Engineers, 1978, revised 1985. Water Control Manaul, Trinidad Lake" (excerpt) A-93

Item 19 Trial Transcript of Proceedings, vol. 15, at 132-34 (excerpt) A-97

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Item 30 Questions Presented, New Mexico's Brief in Support of Exceptions, (Dec. 2, 1982), *Texas v. New Mexico*, 462 U.S. 554 (1983) (No. 65, Original) A-161

• Page numbers beginning with A-1 have been assigned to all Appendix pages except the copies of Pl. Exs. 646 and 698.

Appendix Item 1

Table 1 From Pl. Ex. 30

Decreed and Permitted Well Data Base and Summaries — (Bent County, Prowers County, Pueblo County and Crowley/Otero Counties)

Table 1
From Pl. Ex. 30

Cumulative Number and Capacity of
Irrigation Wells

1948-1985

	UPSTREAM OF JOHN MARTIN RESERVOIR		DOWNSTREAM OF JOHN MARTIN RESERVOIR	
YEAR	NUMBER	CAPACITY (CFS)	NUMBER	CAPACITY (CFS)
1948	792	866	57	128
1949	815	884	63	142
1950	864	935	77	181
1951	927	995	87	210
1952	962	1021	108	283
1953	1051	1126	137	380
1954	1162	1240	168	474
1955	1284	1386	201	564
1956	1331	1439	227	649
1957	1380	1504	248	707
1958	1388	1507	253	722
1959	1419	1528	260	741
1960	1475	1598	290	819
1961	1508	1628	310	880
1962	1522	1638	319	899
1963	1576	1697	416	1115
1964	1713	1846	527	1373
1965	1783	1930	594	1531
1966	1789	1932	609	1581
1967	1794	1939	623	1631
1968	1794	1939	642	1703
1969	1800	1950	653	1730
1970	1803	1952	661	1737
1971	1804	1953	667	1750
1972	1809	1956	678	1775
1973	1810	1957	686	1797
1974	1813	1961	693	1816
1975	1813	1961	701	1843
1976	1813	1961	721	1898

YEAR	UPSTREAM OF JOHN MARTIN RESERVOIR NUMBER	UPSTREAM OF JOHN MARTIN RESERVOIR CAPACITY (CFS)	DOWNSTREAM OF JOHN MARTIN RESERVOIR NUMBER	DOWNSTREAM OF JOHN MARTIN RESERVOIR CAPACITY (CFS)
1977	1816	1962	726	1909
1978	1816	1962	726	1909
1979	1816	1962	727	1914
1980	1816	1962	727	1914
1981	1816	1962	727	1914
1982	1816	1962	727	1914
1983	1816	1962	727	1914
1984	1816	1962	727	1914
1985	1816	1962	727	1914

LOCATION: PUEBLO, OTERO, CROWLEY, BENT AND PROWERS COUNTIES.
TOWNSHIP 20-24 SOUTH AND RANGE 41-65 WEST

SOURCE: DECREED AND PERMITTED WELL DATA BASE, SPRONK WATER ENGINEERS, INC.

FILE: WELLSUMM1.WK1

Appendix Item 2

Excerpt from Pl. Ex. 129

Report by Douglas R. Littlefield, Ph.D.,
"The History of the
Arkansas River Compact,"
August 1990

A-11

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Page 387

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. . . Third, the fundamental idea of maintaining the status quo was well understood by all concerned parties, including both states' negotiators, their constituent water users, and the Bureau of Reclamation.

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Appendix Item 3

Pl. Ex. 580

**Trinidad Effects, 1979-84, Based on
Bureau of Reclamation,
Final Report on Review of Operating Principles,
Trinidad Project, 1988**

Pl. Ex. 580

TRINIDAD EFFECTS
(1000 Acre-feet)

YEAR	CASE I		CASE II	
	NET EFFECT ON JOHN MARTIN (Table 4 - Col. 3)	DEPLETION TO CONSERVATION STORAGE	NET EFFECT ON JOHN MARTIN	DEPLETION TO CONSERVATION STORAGE
1979	−3.1	−1.7	−4.0	−1.8
1980	−4.1	−11.1	−9.0	−17.5
1981	1.1	−2.8	−1.5	−2.3
1982	−1.8	−3.2	−5.4	−3.3
1983	4.3	−4.7	1.7	−2.0
1984	7.0	−1.0	6.6	−1.0
TOTAL	3.5	−24.5	−11.6	−27.5
AVERAGE	0.6	−4.1	−1.9	−4.5

A-17

Appendix Item 4

Pl. Ex. 646

Number of Days When Flow of the Arkansas River at the Stateline is All Used in Kansas (1949-1986)

NUMBER OF DAYS WHEN FLOW OF THE ARKANSAS RIVER
AT THE STATELINE IS ALL USED IN KANSAS

COMPARISON OF C. L. PATTERSON'S DEFINITION OF USABLE FLOW
AND THAT ACTUALLY USED BASED ON OBSERVED FLOWS.

USGS WATER YEAR		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT-MAR TOTAL	APR-SEP TOTAL	ANNUAL TOTAL	% OF TIME STATELINE FLOW IS ALL USED IN KANSAS		
																	OCT-MAR	APR-SEP	ANNUAL
1949	PATTERSON	8	26	27	26	0	0	30	31	19	31	21	10	87	142	229	48%	78%	63%
	ACTUAL	10	0	0	0	0	0	0	0	0	0	0	0	10	0	10	5%	0%	3%
1950	PATTERSON	13	25	31	28	0	0	30	31	29	31	31	18	97	170	267	53%	93%	73%
	ACTUAL	0	0	0	0	0	0	7	13	13	0	0	0	0	33	33	0%	18%	9%
1951	PATTERSON	23	25	27	26	0	0	30	25	26	31	31	8	101	151	252	55%	83%	69%
	ACTUAL	0	0	0	0	0	0	0	6	0	0	0	0	0	6	6	0%	3%	2%
1952	PATTERSON	19	23	28	26	0	0	30	31	30	31	31	30	96	183	279	52%	100%	76%
	ACTUAL	1	0	0	0	0	0	0	0	26	31	25	30	1	112	113	1%	61%	31%
1953	PATTERSON	31	30	31	31	28	31	30	31	30	31	30	30	182	182	364	100%	99%	100%
	ACTUAL	31	13	0	3	10	25	30	31	30	27	18	30	82	166	248	45%	91%	68%
1954	PATTERSON	31	30	31	31	28	31	30	31	30	30	25	30	182	176	358	100%	96%	98%
	ACTUAL	31	22	2	3	0	1	22	31	30	25	21	30	59	159	218	32%	87%	60%
1955	PATTERSON	31	30	31	31	28	31	30	29	30	31	28	30	182	178	360	100%	97%	99%
	ACTUAL	24	6	3	4	2	9	11	16	1	28	23	24	48	103	151	26%	56%	41%
1956	PATTERSON	31	30	31	31	29	31	30	31	30	30	30	30	183	181	364	100%	99%	99%
	ACTUAL	30	17	0	0	1	0	27	27	29	25	27	30	48	165	213	26%	90%	58%
1957	PATTERSON	31	30	31	31	28	31	30	29	30	30	23	10	182	152	334	100%	83%	92%
	ACTUAL	31	30	15	20	14	29	6	15	0	11	18	17	139	67	206	76%	37%	56%
1958	PATTERSON	14	30	31	31	28	1	30	30	30	30	31	30	135	181	316	74%	99%	87%
	ACTUAL	11	0	0	0	0	0	0	0	0	2	6	11	11	19	30	6%	10%	8%
1959	PATTERSON	19	30	31	31	8	0	30	31	30	31	29	10	119	161	280	65%	88%	77%
	ACTUAL	18	18	0	0	0	0	0	1	8	24	18	19	36	70	106	20%	38%	29%
1960	PATTERSON	16	28	31	31	4	0	30	31	30	31	31	30	110	183	293	60%	100%	80%
	ACTUAL	0	0	0	2	1	0	0	9	6	26	31	30	3	102	105	2%	56%	29%
1961	PATTERSON	31	30	31	31	28	31	30	31	29	31	31	30	182	182	364	100%	99%	100%
	ACTUAL	31	30	2	1	1	24	30	31	11	30	30	30	89	162	251	49%	89%	69%
1962	PATTERSON	20	30	31	31	15	0	30	30	30	31	31	30	127	182	309	70%	99%	85%
	ACTUAL	26	2	0	0	0	0	7	18	4	24	28	27	28	108	136	15%	59%	37%
1963	PATTERSON	31	30	31	31	28	31	30	31	30	31	31	30	182	183	365	100%	100%	100%
	ACTUAL	31	30	31	12	1	15	30	31	23	28	31	30	120	173	293	66%	95%	80%
1964	PATTERSON	31	30	31	31	29	31	30	29	30	31	31	30	183	181	364	100%	99%	99%
	ACTUAL	28	30	27	12	8	27	30	29	11	31	31	30	132	162	294	72%	89%	80%
1965	PATTERSON	31	30	31	31	28	31	30	31	20	20	3	0	182	104	286	100%	57%	78%
	ACTUAL	31	30	31	31	28	31	30	30	16	0	0	0	182	76	258	100%	42%	71%
1966	PATTERSON	23	22	22	16	0	0	30	31	28	31	6	0	83	126	209	46%	69%	57%
	ACTUAL	0	0	0	0	0	0	0	23	14	10	1	0	0	48	48	0%	26%	13%
1967	PATTERSON	21	30	31	31	28	8	30	30	30	31	12	0	149	133	282	82%	73%	77%
	ACTUAL	0	2	0	0	0	0	11	24	0	0	0	5	2	40	42	1%	22%	12%
1968	PATTERSON	12	30	31	31	20	0	30	31	30	31	31	30	124	183	307	68%	100%	84%
	ACTUAL	17	0	0	0	0	9	20	21	3	20	21	30	26	115	141	14%	63%	39%
1969	PATTERSON	31	30	31	31	28	31	30	30	30	31	31	29	182	181	363	100%	99%	99%
	ACTUAL	31	30	17	0	0	0	0	3	8	11	19	2	78	43	121	43%	23%	33%
1970	PATTERSON	29	30	31	31	18	0	30	31	30	31	31	30	139	183	322	76%	100%	88%
	ACTUAL	0	0	0	0	9	0	0	23	19	23	27	28	9	120	129	5%	66%	35%
1971	PATTERSON	29	30	31	31	10	0	30	31	30	31	31	30	131	183	314	72%	100%	86%
	ACTUAL	15	0	0	0	0	1	30	29	16	31	31	30	16	167	183	9%	91%	50%

PLAINTIFF'S EXHIBIT
646
Orig. No. 105

NUMBER OF DAYS WHEN FLOW OF THE ARKANSAS RIVER AT THE STATELINE IS ALL USED IN KANSAS

COMPARISON OF C. L. PATTERSON'S DEFINITION OF USABLE FLOW AND THAT ACTUALLY USED BASED ON OBSERVED FLOWS.

USGS WATER YEAR		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT-MAR TOTAL	APR-SEP TOTAL	ANNUAL TOTAL	% OF TIME STATELINE FLOW IS ALL USED IN KANSAS		
																	OCT-MAR	APR-SEP	ANNUAL
1972	PATTERSON	31	30	31	31	29	13	30	31	30	31	31	30	165	183	348	90%	100%	95%
	ACTUAL	31	30	31	29	28	31	30	31	30	31	23	7	180	152	332	98%	83%	91%
1973	PATTERSON	31	30	31	31	28	31	30	31	30	31	31	30	182	183	365	100%	100%	100%
	ACTUAL	31	4	4	3	0	0	0	0	11	31	31	30	42	103	145	23%	56%	40%
1974	PATTERSON	31	30	31	31	28	31	30	31	30	31	31	30	182	183	365	100%	100%	100%
	ACTUAL	31	30	31	14	0	0	11	28	30	31	31	30	106	161	267	58%	88%	73%
1975	PATTERSON	31	30	31	31	28	31	30	31	29	31	31	30	182	182	364	100%	99%	100%
	ACTUAL	31	30	31	31	28	18	27	26	14	19	31	30	169	147	316	93%	80%	87%
1976	PATTERSON	31	30	31	31	29	31	30	31	30	31	31	30	183	183	366	100%	100%	100%
	ACTUAL	31	30	31	31	29	31	30	31	30	31	31	30	183	183	366	100%	100%	100%
1977	PATTERSON	31	30	31	31	28	31	30	31	30	31	31	30	182	183	365	100%	100%	100%
	ACTUAL	31	30	31	31	28	31	30	31	30	31	31	30	182	183	365	100%	100%	100%
1978	PATTERSON	31	30	31	31	28	31	30	31	29	31	31	30	182	182	364	100%	99%	100%
	ACTUAL	31	30	31	31	28	31	30	31	28	31	31	30	182	181	363	100%	99%	99%
1979	PATTERSON	31	30	31	31	28	31	30	31	30	31	31	30	182	183	365	100%	100%	100%
	ACTUAL	31	30	31	31	28	31	30	31	30	31	31	30	182	183	365	100%	100%	100%
1980	PATTERSON	31	30	31	31	29	31	30	31	30	19	31	30	183	171	354	100%	93%	97%
	ACTUAL	31	30	31	31	29	31	30	31	30	31	12	30	183	164	347	100%	90%	95%
1981	PATTERSON	31	30	31	31	28	31	30	31	30	31	31	30	182	183	365	100%	100%	100%
	ACTUAL	31	30	31	17	0	23	30	31	30	31	31	30	132	183	315	73%	100%	86%
1982	PATTERSON	31	30	31	31	28	31	30	31	30	31	31	30	182	183	365	100%	100%	100%
	ACTUAL	31	30	31	31	28	31	30	31	30	31	31	30	182	183	365	100%	100%	100%
1983	PATTERSON	31	30	31	31	28	31	30	31	30	31	23	30	182	175	357	100%	96%	98%
	ACTUAL	31	30	31	1	20	31	21	31	30	31	31	30	144	174	318	79%	95%	87%
1984	PATTERSON	15	30	31	31	16	0	30	31	30	24	31	21	123	167	290	67%	91%	79%
	ACTUAL	31	30	31	19	7	25	14	22	30	28	30	30	143	154	297	78%	84%	81%
1985	PATTERSON	12	24	28	31	0	0	30	31	13	29	13	0	95	116	211	52%	63%	58%
	ACTUAL	18	0	0	0	0	3	23	6	0	29	14	7	21	79	100	12%	43%	27%
1986	PATTERSON	19	25	29															
	ACTUAL	0	0	0															
AVERAGES (W/O 1986)																			
	PATTERSON	26	29	30	30	21	18	30	31	29	30	28	24	154	171	325	85%	93%	89%
	ACTUAL	22	17	14	10	9	13	17	21	17	22	21	22	85	120	205	47%	66%	56%
MINIMUMS (W/O 1986)																			
	PATTERSON	8	22	22	16	0	0	30	25	13	19	3	0	83	104	209	46%	57%	57%
	ACTUAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0%	0%	2%
MAXIMUMS (W/O 1986)																			
	PATTERSON	31	30	31	31	29	31	30	31	30	31	31	30	183	183	366	100%	100%	100%
	ACTUAL	31	30	31	31	29	31	30	31	30	31	31	30	183	183	366	100%	100%	100%

PERCENTAGE OF TIME ALL STATELINE FLOW IS USED IN KANSAS (W/O 1986)													NOV-MAR AVERAGE	APR-OCT AVERAGE
PATTERSON	83%	97%	98%	97%	74%	59%	100%	99%	96%	97%	89%	80%	85%	92%
ACTUAL	71%	56%	44%	34%	31%	43%	56%	67%	56%	72%	69%	73%	42%	66%

USABLE FLOW PERCENTAGES (PER HCI)														
HCI	82%	35%	35%	35%	35%	35%	82%	82%	82%	82%	82%	82%	35%	82%

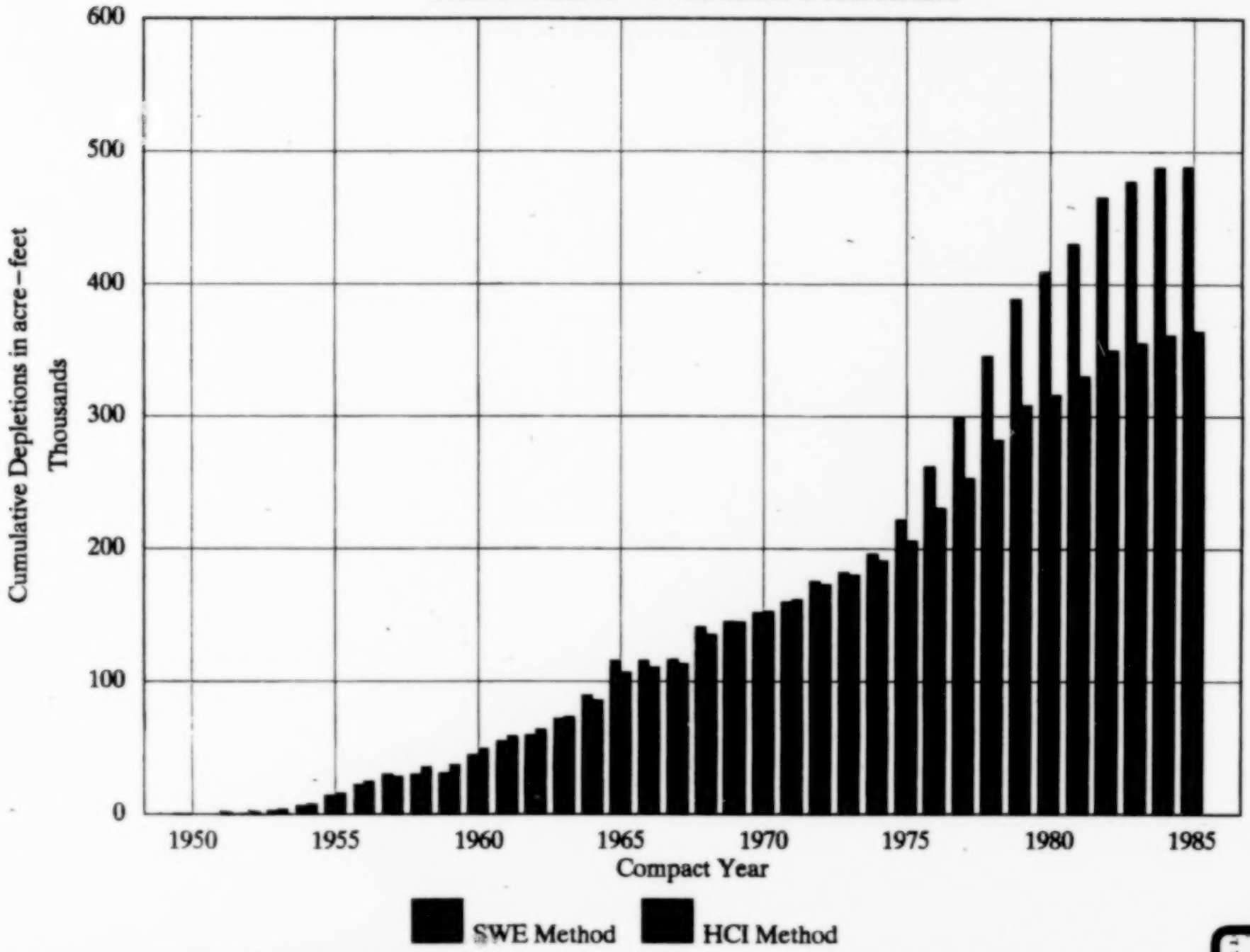
Appendix Item 5

Pl. Ex. 698

Usable Stateline Depletions, Combined Effects - SWE Method and HCI Method (Cumulative), 1950-1985

Usable Stateline Depletions

Combined Effects – SWE Method & HCI Method



Note: For compact year 1950, depletions were assumed to be zero for months of November and December.
Values shown are derived from Pl. Exhibits 560** and 647.

PLAINTIFF'S EXHIBIT
698
Case No. 105

Appendix Item 6

Excerpt from Def. Ex. 134*

**Boyle Engineering Corporation and
Tipton & Kalmbach, Inc.,
Arkansas River Basin Study,
Results of Winter
Water Storage Program Simulation
(December 1990)**

Columns (1) and (16) from Page 8.1, Def. Ex. 134*
POTENTIAL IMPACT OF WINTER WATER
STORAGE SIMULATION
** PASS #2 ** (ACRE-FEET)

.....

COMP YEAR (1)	— CHANGE IN STATE LINE FLOW — ANNUAL (16)
1950	230
1951	221
1952	148
1953	−137
1954	106
1955	63
1956	−101
1957	−233
1958	−281
1959	−162
1960	−217
1961	10
1962	105
1963	−57
1964	−103
1965	−350
1966	−393
1967	−540
1968	−919
1969	−1178
1970	−895
1971	−1259
1972	−1116
1973	−731
1974	−447
1975	−636
1978	−693
1950−75 & 78 AVG	−354

Notes:

(a) A positive value indicates an increase in river gain, diversion or storage as a net result of the simulation of the winter water storage program.

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Appendix Item 7

Excerpt from Def. Ex. 1011

Changes in Stateline Flow
ADMIN.FOR (Dec. 1991 version and Feb. 24, 1992 version of RIGHT.DAT)
and Modified HI Model (Sep. 1992)

CHANGES IN STATELINE FLOW
ADMIN.FOR (Dec. 1991 version and Feb. 24, 1992 version of RIGHT.DAT)
and Modified HI Model (Sep. 1992)

	INSTITUTIONAL CONDITIONS					TOTAL		SWE'S USABLE		HCI's USABLE (Helton's coeff.)	
COMP	OUR RUN	PUMP	WW	1980	TM	DEPLETIONS	DEPLETIONS& ACCRETIONS	DEPLETIONS	DEPLETIONS& ACCRETIONS	DEPLETIONS	DEPLETIONS& ACCRETIONS
							.....				
4	D3	H	H	C	H	25,892	22,233	16,484	12,897	10,981	8,342
	D4	H	C	C	H	MODIFIED HI MODEL					
							.....				

Appendix Item 8

Excerpt From Def. Ex. 1012

Changes in Stateline Flow, ADMIN.FOR (Dec. 1991 version and Feb. 24, 1992 version of RIGHT.DAT) and Winter Consumptive Use Modification to HI Model (Sep. 1992)

CHANGES IN STATELINE FLOW

ADMIN.FOR (Dec. 1991 version and Feb. 24, 1992 version of RIGHT.DAT)
and Winter Consumptive Use Modification to HI Model (Sep. 1992)

		INSTITUTIONAL CONDITIONS				TOTAL		SWE'S USABLE		HCI's USABLE (Helton's coeff.)	
COMP	OUR RUN	PUMP	WW	1980	TM	DEPLETIONS	DEPLETIONS& ACCRETIONS	DEPLETIONS	DEPLETIONS& ACCRETIONS	DEPLETIONS	DEPLETIONS& ACCRETIONS
						*****					
4	N26	H	H	C	H	25,532	−29,462	16,454	199	7,012	−31,986
	N27	H	C	C	H	MODIFIED HI MODEL TO ALLOW WINTER PET TO VARY WITH IRR. APPLICATION RATE					

Appendix Item 9

Excerpt from Jt. Ex. 3

The Record of Meetings of the Colorado-Kansas Arkansas River Compact Commission

Mr. Dixon [Director of Branch of Project Planning,
U.S. Bureau of Reclamation]

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My understanding in reading this, and the purpose of my question was—this says, "shall not be depleted in usable quantity or availability for use to the water users"—

Mr. Vidal [Commissioner for Colorado]

MR. VIDAL: Under this Compact.

MR. DIXON: Under this Compact, yes.

MR. VIDAL: We are trying to preserve a status quo.

MR. DIXON: I understand that. Of course, we are sympathetic to that objective.

•••••

13-100

Appendix Item 10

Excerpt from Jt. Ex. 4

Transcripts of Meetings of the Colorado-Kansas Arkansas River Compact Commission From the Files of General Kramer in the National Archives

[Pages 54-55]

•••••

MR. VIDAL: ••••• We are compacting about the present existing situation.

MR. KNAPP: That is right, we are compacting on the present condition. I am sure the Kansas Commissioners will want to be assured that the present conditions on the river will not be disturbed by the possibility of consumptive uses upstream.

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A-41

Appendix Item 11

Excerpt from Jt. Ex. 18-32

Annual Reports of the Arkansas River Compact Administration From 1949 Through December, 1984

[Pages 47-48]

APPENDIX "C-3"

Resolution

CONCERNING
AN INVESTIGATION OF
TRINIDAD RESERVOIR OPERATIONS

WHEREAS, it has come to the attention of the Arkansas River Compact Administration that 18,290 acre-feet of water stored under the Model Reservoir water right in Trinidad Reservoir during compact year 1979 was transferred to the joint use pool on September 28, 1979 by action of the Board of Directors of the Purgatoire River Water Conservancy District without objection from the Divis[i]on Engineer for Division 2, Colorado Division of Water Resources; and

WHEREAS, an additional 20,000 acre-feet was stored in Trinidad Reservoir under the Model Reservoir right during compact year 1980; and

WHEREAS, the State of Kansas has questioned whether these actions are in conformity with the operating principles for Trinidad Reservoir;

NOW, THEREFORE, BE IT RESOLVED that pursuant to Article VIII, paragraph H of the Arkansas River Compact, the Compact Administration shall cause an investigation to be made of these circumstances; and

BE IT FURTHER RESOLVED that this investigation shall be accomplished on behalf of the Compact Administration by the Colorado Water Conservation Board and the Kansas Division of Water Resources, which entities shall conduct said investigation as promptly as possible and report their determinations to the Compact Administration as soon as possible after the adoption of this resolution.

Entered this 30th day of June, 1980, at a special meeting of the Compact Administration held in Lamar, Colorado.

/s/ Frank G. Cooley, Chairman .
Arkansas River Compact
Administration

/s/ Leo Idler, Secretary
Arkansas River Compact
Administration

APPENDIX "C-4"

Resolution

CONCERNING
TRINIDAD RESERVOIR

WHEREAS, the Arkansas River Compact Administration has made findings of fact relative to Trinidad Reservoir in Colorado, which findings were made at the special meeting of the Administration held in Lamar, Colorado, on September 25, 1980 (copy attached);

NOW THEREFORE, BE IT RESOLVED that the Administration goes on record as recognizing that the findings of fact made by the Administration have raised a question as to whether the waters of the Arkansas River have been materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas; and

BE IT FURTHER RESOLVED that the Administration recommends that the Kansas State Engineer confer with the Colorado State Engineer to make further inquiries into this question as expeditiously as possible.

Entered this 25th day of September, 1980, at a special meeting of the Administration held in Lamar, Colorado.

/s/ Frank G. Cooley, Chairman
Arkans[s]as River Compact
Administration

/s/ Leo Idler, Secretary
Arkansas River Compact
Administration

Appendix Item 12

Excerpt from Jt. Ex. 19

Minutes of Meetings of the Arkansas River Compact Administration from 1949 Through December, 1984

MINUTES OF
ARKANSAS RIVER COMPACT ADMINISTRATION
SPECIAL MEETING

Court House
Lamar, Colorado
June 6, 1967

Attendance:

For Colorado:

Felix L. Sparks, Denver
Ernest Hofmeister, Lamar
George F. Reyher, McClave

For Kansas:

Robert V. Smrha, Topeka
Carl E. Bentrup, Deerfield
Logan N. Green, Garden City

For the United States:

Wilbur L. Heckler, Albuquerque, New Mexico

Others Attending:

G. D. Steward	Otero Co.	Rocky Ford, Colo.
Wayne Campbell	La Junta Chamber of Com.	La Junta, Colo.
Earl Beegles	Otero Co. Comm.	La Junta, Colo.
Everette Marshall	Catlin Ditch Board	La Junta, Colo.

Glenn G. Saunders	Purgatoire W.C. Dist.	Denver, Colo.
E. A. Thaxton	SECRA Chairman	Las Animas, Colo.
G. E. Kimble	Holbrook Lake Sptmns. Club	Swink, Colo.
Harry J. Figge	Colo. Game, Fish & Parks	Denver, Colo.
Robert A. Buchhagen	Corps of Engineers	John Martin Res.
Ross W. Moor	U.S.G.S.	Lamar, Colo.
Howard C. Corrigan	Div. of Water Res.	Garden City, Kans.
Leo J. Olson	C.F.I. Corp.	Pueblo, Colo.
Geo. T. O'Malley, Jr.	Colo. Game, Fish & Parks	Denver, Colo.
Bernie Bovee	Colo. Game, Fish & Parks	Colo. Spgs., Colo.
LeRoy Nickelson	Fort Bent	Lamar, Colo.
C. L. Nickelson	Fort Bent	Lamar, Colo.
Wm. Howland	Amity Mutual Canal	Holly, Colo.
Sisto Guidotti	Amity Mutual Canal	Bristol, Colo.
Carter Hutchinson	C.W.C.B.	Denver, Colo.
Harry C. Nevius	Amity Mutual Canal	Lamar, Colo.
W. T. Setchfield	Bent Co. Rec. Board	Las Animas, Colo.
James Donnelly	Chmn, Purgatoire W.C. Dist.	Trinidad, Colo.
Charles J. Cappellinni	Purgatoire W.C. Dist.	Trinidad, Colo.
Max Torres	Purgatoire W.C. Dist.	Trinidad, Colo.

J. L. Ogilvie	Bureau of Reclamation	Pueblo, Colo.
Ralph L. Strother	Corps of Engineers	Albuq., New Mexico
Leo J. Gamble	Bureau of Reclamation	Pueblo, Colo.
Edw. J. Tripp	U.S.G.S.	Denver, Colo.
Claire Behan	KLMR Radio	Lamar, Colo.
Donn Bynum	Tri-State Daily News	Lamar, Colo.
Clyde Albertson	Bent Co. Commissioners	Las Animas, Colo.
Frank Richards	Chamber of Commerce	Las Animas, Colo.
Dutch Schneider	Bowling Alley Owner	Las Animas, Colo.
Jack Robinson	City Council	Las Animas, Colo.
Fred L. Boydston	C.W.C.B.	Denver, Colo.
Francis M. Bell	C.W.C.B.	Denver, Colo.

MEETING CALLED TO ORDER

Chairman Heckler called the meeting to order at 9:55 A.M. He said that his first official duty was to present his credentials to the Administration. He next called for consideration of the minutes of the December 14, 1966 meeting. There being no corrections, the minutes were approved as submitted. The Chairman then read his report as follows:

REPORT

1. Appointment Credential—My appointment as federal representative to the Arkansas River Compact Administration was made by President Lyndon B. Johnson by letter of January 25, 1967. Copies of the appointment letter have been furnished to the commissioners of both States.

•••••

OLD AND NEW BUSINESS

Mr. Heckler then asked if there was any unfinished business. There being none, he passed on to new business and suggested consideration of the Trinidad Project as the first item.

Mr. Sparks was asked to present the Trinidad Project for consideration. He said the project had been before the Administration for a long time and he asked if Kansas had any further questions on the project.

Mr. Smrha said that the revised operating principles had not been submitted to the Administration as such.

Mr. Sparks then submitted the revised operating principles along with a letter written to the ditch companies in Kansas. He said this material had been previously submitted to the State of Kansas. After some discussion Mr. Sparks said that these were the same principles that were submitted originally to the Administration and in addition contained the five points requested by the State of Kansas.

Mr. Bentrup said there seemed to be some conflict in Article VI whether there should be a ten-year review or a five-year review and Mr. Ogilvie was called upon to explain it.

Mr. Ogilvie said the amendments specify a five-year review shall be made instead of a ten.

After some discussion Mr. Saunders said that the amendments to the document supersede the original document.

Mr. Sparks said that in all documents such as this, the amendments supersede the original document.

Mr. Smrha then asked Mr. Ogilvie if the operating principles as amended had been sent to the ditch companies and if there had been any response to these.

Mr. Ogilvie said there had been no response from the ditch companies.

Mr. Sparks then asked if Kansas wanted anything further done with respect to the operating principles.

Mr. Smrha replied that if the question of approval was submitted to the Administration then Kansas will act.

Mr. Sparks then moved and Mr. Hofmeister seconded a motion that the Administration approve the operating principles with the understanding that the amendments take precedent over the original operating principles as presented.

Mr. Green said that he thought that it would be less clumsy to redraw the principles and incorporate the amendments into a single document. He said that as of now there were two documents to approve. He suggested that if everything were incorporated into one document then everyone would know what it means.

Mr. Sparks then asked Mr. Ogilvie to explain the operating principles and amendments.

Mr. Ogilvie said the amendments do take precedent over the original item and that the items included make one document. Mr. Ogilvie further said that at the first review the operating principles would be revised and amended as deemed necessary.

Mr. Smrha then asked for a recess of five minutes to which Mr. Heckler agreed.

Mr. Heckler reconvened the recessed meeting and Mr. Green said that the Kansas delegates had caucused and thought that if the letter of March 20, 1967, from H. P. Dugan to the Governor of Kansas and countersigned by the Purgatoire Conservancy District was referred to in an amended motion then Kansas could act upon that.

Mr. Sparks said that he would like to withdraw his original motion and make a new motion, which he did as follows:

Moved that the document of March 20, 1967 submitted to Governor Docking and signed by H. P. Dugan and countersigned by Dr. Donnelly be approved by the Arkansas River Compact Administration. Mr. Green seconded the motion and after some discussion the motion was carried by vote of the states. The documents are attached as Appendix A.

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APPENDIX A

7-100

Hon. Robert Docking
Governor of Kansas
Topeka, Kansas

Dear Governor Docking:

On February 1, 1967, I concurred with views of the Kansas Water Resources Board and the State of Kansas relative to the Trinidad Project and the plan of operation as set forth in the "Operating Principles". At the same time, evidence of acceptance by the Purgatoire River Water Conservancy District of the five conditions set forth in Governor Avery's letter of December 30, 1966 was presented. Subsequent discussion with representatives of the Kansas Water Resources Board indicates the desirability of setting forth the "Operating Principles" and the five conditions clearly in one document so as to avoid any misunderstanding in the future as to their intent and purpose. I concur in this suggestion and, accordingly, quoted below are the "Operating Principles" as contained in the Irrigation Report on the Trinidad Project, Colorado, July 1964 (Revised September 1964) and the five conditions suggested in Governor Avery's letter of December 30, 1966:

OPERATING PRINCIPLES

TRINIDAD DAM AND RESERVOIR PROJECT

Preamble

The Trinidad Dam and Reservoir Project as reported in House Document No. 325, 84th Congress, 2d Session, and as authorized by the Flood Control Act of 1958, will be operated in such a manner as to secure the greatest practicable benefits from the

regulation and use of the flows of the Purgatoire River consistent with the laws and policies of the State of Colorado and of the United States including the Arkansas River Compact. The objectives and principles governing the operation of the Trinidad Dam and Reservoir Project to secure such benefits are contained within the following articles.

Article I - OBJECTIVES
Article II - DEFINITION OF TERMS
Article III- FLOOD CONTROL
Article IV- IRRIGATION
Article V - FISHERY AND RECREATION
Article VI- REVIEW AND AMENDMENT

Article I—OBJECTIVES

The operation of the Trinidad Dam and Reservoir involves the regulation of the flows of the Purgatoire River for flood control, irrigation use, and recreation including a permanent fishery pool. The project plan provides for:

1. Control of floods originating above the reservoir for benefit of the city of Trinidad and downstream reaches.
2. Optimum beneficial use of the available water for irrigation within the project area consistent with the protection of downstream non-project rights as set forth in House Document No. 325, 84th Congress, 2d Session, which provides:
   (a) Transfer of the storage decree of the Model Land and Irrigation Company for 20,000 acre-feet annually from the present site to the proposed Trinidad Reservoir.
   (b) Storage in the Trinidad Reservoir of flood flows originating on the Purgatoire River above the dam site which would otherwise spill from John Martin Reservoir.
   (c) Storage in Trinidad Reservoir of the winter flows of the Purgatoire River historically diverted for winter irrigation of project lands.
3. The maintenance of a minimum pool for enhancement of recreation and fishery values.

4. The construction of the Trinidad Dam and Reservoir with the following allocated capacities:

Flood control	51,000 acre-feet
Irrigation	20,000 acre-feet
Permanent fishery pool	4,500 acre-feet
Joint use*	39,000 acre-feet
Total capacity	114,500 acre-feet

* For irrigation and sediment accumulation

Article II—DEFINITION OF TERMS

Definition of terms as used herein:

1. "Reservoir" means the reservoir presently planned and authorized for construction on the Purgatoire River above the city of Trinidad, Colorado.
2. "District" means the Purgatoire River Water Conservancy District, that entity created and existing under laws of the State of Colorado to contract for repayment to the United States of an appropriate share of the project costs allocated to the irrigation use. The District shall also be the agency responsible for the regulation of irrigation water supplies within the District boundaries in the manner set forth therein.
3. "Unused Sediment Capacity" means that portion of the 39,000 acre-feet of reservoir capacity allocated to joint use but unoccupied by sediment at any given time.
4. "Irrigation Capacity" means the 20,000 acre-feet of reservoir capacity allocated to irrigation plus the unsedimented portion of the joint use capacity.
5. "Permanent Fishery Pool Capacity" means the 4,500 acre-feet of reservoir capacity allocated to fishery and recreation.
6. "Permanent Fishery Pool" means the quantity of water stored in the permanent fishery pool capacity.
7. "Flood Control" means the temporary storage of flood waters at any reservoir pool level as necessary to alleviate flood damages through the city of Trinidad and downstream reaches.

8. "Flood Control Capacity" means the 51,000 acre-feet of capacity exclusively allocated to flood control lying initially above m.s.l. reservoir elevation 6229.6.
9. "Reservoir Inflow" is to be expressed in mean daily cubic feet per second of time and means that total flow of water entering the reservoir, comprising measured flows at the inflow gaging stations and other unmeasured inflows entering the reservoir, less such flow of water as may be acquired by the State of Colorado for filling and maintaining the permanent fishery pool.
10. "District Irrigable Area" means only the 19,717 acres of Class 1, 2 and 3 irrigable lands to be served lying within District boundaries.
11. "Irrigation Season" means that period of the year, as determined annually by the District, during which water may be beneficially applied to the District irrigable area, provided the irrigation season will not begin earlier than April 1 or end later than October 15, except as modified by the District with the consent of the Secretary of Interior.
12. "Nonirrigation Season" means that period of the year other than the irrigation season.
13. "District Storage Right" means those rights under which the District may store water in the irrigation capacity for use on the District irrigable area.
14. "District Water Supply" means that water supply of the Purgatoire River subject to District administration for irrigation use within the District irrigable area.
15. "Colorado State Engineer" means the Colorado State Engineer or such other administrative agency having jurisdiction and control over the distribution of the waters of the State of Colorado.
16. "Operating Agency" means the U.S. army Engineer District, Albuquerque, New Mexico, Corps of Engineers.

Article III—FLOOD CONTROL

Trinidad Reservoir shall be operated for flood control benefits in accordance with regulations prescribed by the Secretary of the Army and the following operating principles:

1. All potentially damaging flood inflows shall be temporarily detained as necessary to limit the flow insofar as possible to a nondamaging flow,currently estimated to be 5,000 c.f.s., downstream from the Trinidad Reservoir.
2. All flood waters stored in the flood control capacity shall be released at the maximum nondamaging rate insofar as practicable.
3. Any inflow, other than that stored for irrigation use, temporarily retained below the bottom of the flood control capacity for flood control purposes, shall be released by the operating agency at such a rate, time, and quantity as may be ordered by the Colorado State Engineer, but within nondamaging flow in the channels below the reservoir.

Article IV—IRRIGATION

Administration of the irrigation capacity in Trinidad Reservoir and the distribution of water to the District irrigable area will be made by the District in accordance with House Document No. 325, 84th Congress, 2d Session, and these operating principles. Agreements, satisfactory to the Secretary of the Interior, shall be entered into between the District and the ditch companies and other owners of affected water rights to insure that these principles and the operation described herein shall be adopted.

The principles and provisions under which the District will administer water supplies to the District irrigable area are contained in the following four parts of this Article: "Water Rights", "Limits of Land and Water Use", "District Water Supply", and "Operation and Exercise of Water Rights".

A. Water Rights

Accomplishment of the following conditions is necessary under the laws of the State of Colorado to provide the District with

the right to regulate the flows of the Purgatoire River in the manner described herein:

1. The water users within the District shall assign the right to the exercise of all the decreed direct flow water rights within the District boundaries to the District for administration by the District at such times and to the degree outlined in these principles. The right to the exercise of the following water rights, all in water District No. 19, shall be so assigned.
2. Waters of the Purgatoire River shall be stored by the District in the irrigation capacity of Trinidad Reservoir under rights created under Colorado law; said rights, defined as the District storage right, include:
   (a) The Model storage right, being the right to store 20,000 acre-feet of water from the flows of the Purgatoire River, under reservoir priority No. 10 in Water District No. 19 at a rate of flow not exceeding 700 cubic feet per second of time under date of appropriation of January 22, 1908, as decreed by the District Court of Las Animas County, Colorado, on January 12, 1925, which right shall, by appropriate statutory proceedings be transferred from the place of storage as originally decreed to the site of the reservoir; and

   (b) Such other rights to store water in the reservoir as the District may lawfully acquire by appropriation or purchase.

Priority		Amount	
Number	Date	(cfs)	Name of Ditch
3	11/30/61	6.00	Baca
5	3/20/62	4.00	Johns Flood
7	4/30/62	7.00	Chilili
8	11/15/62	2.82	Baca
8	11/15/62	1.18	El Moro
9	1/1/63	1.28	Johns Flood
9	1/1/63	4.72	Hoehne

12	6/30/63	0.50	South Side
13	1/1/64	1.25	Johns Flood
13	1/1/64	3.75	Lewelling & McCormick
15	4/10/64	5.10	Johns Flood
15	4/10/64	0.80	Hoehne
15	4/10/64	2.54	Salas
19	6/1/65	4.00	Lewelling & McCormick
20	10/7/65	7.35	Johns Flood
20	10/7/65	16.65	Hoehne
21	1/1/66	6.00	Burns & Duncan
22	2/1/66	4.00	Salas
27	5/31/66	2.25	Johns Flood
27	5/31/66	2.25	Salas
40	4/30/68	1.40	South Side
64	4/1/73	2.40	Johns Flood
73	11/1/75	6.00	South Side
74	2/17/76	34.00	South Side
75	12/25/76	4.00	South Side
77	3/11/77	1.30	El Moro
77	3/11/77	2.70	Baca
80	4/7/77	18.60	South Side
93	12/15/82	4.00	South Side
95	11/4/83	14.38	Baca
96	11/23/83	16.84	South Side
98	4/30/84	60.00	South Side
103	6/21/86	14.73	Baca
104	10/21/86	10.00	Lewelling & McCormick
106	3/12/87	15.00	Baca
108	2/15/88	9.70	South Side
109	3/1/88	8.00	South Side
137	11/23/97	2.00	V. Florez
145	10/20/02	100.00	Johns Flood
152	12/31/03	2.00	V. Florez
168	1/22/08	200.00	Model
242½	6/12/20	45.56	Baca

B. Limits of Land and Water Use

In order that the Trinidad Dam and Reservoir Project may provide an optimum beneficial use of water for irrigation within the District, the following limitations on land and water use shall apply:

1. The acreage irrigated by the District water supply shall be limited to the 19,717 acres classified as 1, 2 and 3 irrigable land lying within the District boundaries. These 19,717 acres of the District irrigable area shall be composed as nearly as practicable of the following acreages under individual ditches:

Baca	2,428	acres
Chilili	114	"
El Moro	160	"
Johns Flood	1,854	"
Model	6,177	"
South Side	6,359	"
Victor Florez	22	"
Hoehne	1,742	"
Burns & Duncan	322	"
Lewelling & McCormick	378	"
Salas	161	"
Total	19,717	acres

2. All water deliveries to the 19,717 acres of the District irrigable area will be limited during the irrigation season to the irrigation requirements at the farm headgate as determined by the District. Allowance for canal and lateral losses on the individual ditch systems will also be determined by the District.
3. No water deliveries for irrigation of the 19,717 acres of the District irrigable area will be made during the non-irrigation season.

C. District Water Supply

1. That water supply of the Purgatoire River subject to District administration for irrigation use within the District irrigable area, defined as the District water supply, consists of:
   (a) The water stored under the District storage right in the irrigation capacity.
   (b) The stream gains to the Purgatoire River below Trinidad Dam that are divertible to the District irrigable area for irrigation use through the District's exercise of the rights listed in IV.A.1.
   (c) That portion of the reservoir inflow bypassed to the river below Trinidad Dam which is subject to diversion to the District irrigable area through the District's exercise of the water rights listed in IV.A.1.
2. The District water supply will be allocated by the District to the ditches within the District to provide each acre of the District irrigable area an equitable share of the District water supply after allowance has been made for individual ditch transportation losses, provided such allocation will not exceed the irrigation requirements at the farm headgate.

D. Operation and Exercise of Water Rights

The principles governing operation of the irrigation capacity and the District's exercise of the assigned direct flow water rights listed under IV.A.1. and the District storage right are hereinafter set forth as they apply to operations during the entire year as well as to operations during either the non-irrigation season or irrigation season.

1. Non-interference with Downstream Water Rights
   (a) Bypasses to the river shall be made at any time during the year to satisfy downstream senior rights as ordered by the Colorado State Engineer to the extent that such demands are not met by stream gains or otherwise satisfied but are limited to the extent as determined by the Colorado State Engineer to actually

benefit such rights without unnecessary waste through channel losses.
   (b) Reservoir inflow in excess of the amount stored under the transferred Model right may be detained in the reservoir at such times as John Martin Reservoir is reasonably expected to spill; to the extent that John Martin Reservoir would have spilled, such detained water shall be considered to have been stored under the District storage right and become part of the District water supply. Such detained water which does not become a part of the District water supply shall be released as called for by the Colorado State Engineer in the amounts and at such times as he shall determine that such releases may be required to avoid a material depletion of the water of the Arkansas River as defined in Article 3 of the Arkansas River Compact, C.R.S., 1953, 148-9-1.
   (c) Except as provided by paragraph (b) above, any water temporarily detained in the reservoir as a result of the reservoir inflow exceeding the design outlet capacity of the reservoir shall be released as soon as possible.
   (d) All releases from the reservoir, as set forth in (a), (b) and (c) above, shall be passed down the Purgatoire River without interference by water users in the District irrigable area.
2. District Operation, Non-irrigation Season
   (a) During the non-irrigation season the District will provide an allowance for stock watering purposes of not more than a daily mean flow of five second-feet or its volume equivalent measured at a gage to be located near and above the Baca River headgate. If the stream gains from the Trinidad Dam to the said gage are insufficient to fulfill the allowance, an equivalent volume of reservoir inflow will be released to satisfy stock water demands within the allowance.

(b) During the non-irrigation season the District will exercise the direct flow water rights and the District storage right only at such times and to the degree as necessary to assure:

(1) That the maximum possible storage of reservoir inflow is accrued.

(2) The stock water allowance is distributed in a manner determined equitable by the District.

3. District Operation—Irrigation Season

(a) During the irrigation season, except at such times as provided for in IV.D.3.(c) below, the District shall exercise the direct flow water rights and the District storage right only at such times and to the degree necessary to assure:

(1) That stream gains to the river below Trinidad Dam which are divertible to the District irrigable area and such reservoir inflow which is bypassed to the river for District irrigation use will be equitably distributed to the District irrigable area as part of the allocated District water supply.

(2) That the District storage right can be fully exercised to store reservoir inflow in excess of that bypass to the river as may be required under D.1.(a) and D.3.(a)(1) above.

(b) During the irrigation season water stored in the irrigation capacity will be released as needed to fulfill or partially fulfill the irrigation requirements of the District irrigable area as part of the allocated District water supply.

(c) During the irrigation season, when the irrigation capacity is empty as determined by the District, the District will relinquish its exercise of the direct flow water rights provided that if the reservoir inflow and stream gains below Trinidad Dam which are divertible to the District irrigable area exceed the irrigation requirement and such excess is storable under the District

storage right, the District will resume the exercise of the direct flow rights and exercise of the District storage right as in D.3.(a)(2) above.

4. Evaporation and Seepage Losses

In the accounting for water in storage, evaporation and seepage losses due to water stored in the irrigation capacity shall be determined using the most recent data available by the Colorado State Engineer and the District with the cooperation of the operating agency.

Article V—FISHERY AND RECREATION

The permanent fishery pool shall be operated in accordance with the following principles:

1. Water for the initial and subsequent fillings and for replacing evaporation and seepage losses will be acquired by the State of Colorado without interference to the District water supply or without additional cost to the District or the United States for the Trinidad Project as envisioned in House Document No.325.
2. In the accounting for water in storage, evaporation and seepage losses due to the permanent fishery pool shall be determined using the most recent data available by the Colorado State Engineer and the District with the cooperation of the operating agency.
3. There shall never be any release of water from the permanent fishery pool except upon the request of the Colorado Game, Fish, and Parks Commission to the Colorado State Engineer.

Article VI—REVIEW AND AMENDMENT

These operating principles may be subject to review and amendment not more than once a year at the request of any of the parties' signatory; provided, that at least one review shall be accomplished within the first 10 years following completion of the Trinidad Dam and at least one review be accomplished every 10 years thereafter. The primary object of such reviews

will be obtaining optimum beneficial use of water as conditions change, operating experience is gained, and more technical data become available.

FIVE CONDITIONS

State of Kansas

1. All inflows over established Colorado water rights (1156.05 cfs) be designated flood flows and released as promptly as downstream conditions permit. The only time water so designated may be stored in the conservation pool will be when John Martin Reservoir does not have the capacity to store additional water.

2. Any subsequent amendment of the operating principles should be subject to review and approval of the same interests as provided for in the original procedure.

3. Assurances that there will be no significant increase in water use which would result in a depletion of water yield to other Colorado and Kansas water users.

4. That 5 years after beginning operation of the Trinidad Reservoir for irrigation purposes, the operating principles be reviewed to determine the effect, if any, the operation has had on other Colorado and Kansas water users and the principles amended as necessary. Each 10 years thereafter reviews should be provided with amendments as needed.

5. All operating records be open for inspection by any qualified representative of the Arkansas River Compact Administration.

The Bureau of Reclamation concurs fully with the "Operating Principles" as set forth above and further agrees with the five conditions noted and suggested by the State of Kansas, also stated above.

To further assure acceptance and complete understanding of the "Operating Principles" and the five conditions, both set forth herein, and consistent with the resolution of the Purgatoire River Water Conservancy District, Dr. James E. Donnelly, President of the District, is joining the Bureau of Reclamation in this letter and so indicates by his signature, approving in its entirety the material set forth herein. Authority for Dr. Donnelly's approval is contained in a resolution passed by the Purgatoire River Water Conservancy District on January 26, 1967 and a copy of this resolution and Dr. James E. Donnelly's letter of January 26, 1967 is attached for your ready reference.

I am sure this adequately documents the intent and purpose of complying with the provisions set forth herein by the parties concerned and I would appreciate early advice from you of the State of Kansas' approval of this action.

Sincerely yours,

/s/ H.P. Dugan
H.P. Dugan
Director
PURGATOIRE RIVER WATER
CONSERVANCY DISTRICT
By: /s/ James E. Donnelly
James E. Donnely, President
Enclosures
cc:
Commissioner, Attention: 400 (with enclosures)
Project Manager, Pueblo, Colorado, Attention: P-100 (with enclosures)

Appendix Item 13

Excerpts from Jt. Ex. 23

Final Report by the U.S. Bureau of Reclamation on the Review of Operating Principles, Trinidad Project, Colorado (December 1988)

Table 4

TRINIDAD PROJECT
EFFECTS ON THE INFLOW TO JOHN MARTIN RESERVOIR
CAUSED BY THE TRANSFER OF WATER OUT OF
THE MODEL STORAGE RIGHT AND THE STORAGE
OF WINTER WATER UNDER THE
DIRECT FLOW RIGHTS—1979-1984.

CASE #/YR	NET EFFECT ON J.M. RES. INFLOW
.....	.....
CASE #3 (1HAD/79-84NS)	
1979	−4.0
1980	−9.0
1981	−1.5
1982	−5.4
1983	1.7
1984	6.6
TOTAL	−11.6
AVERAGE	−1.9

(Rev. 12/27/88)

[Page 26]

.....

From a standpoint of injury to downstream users, Case 1 gives the most reasonable results. However, none of the three studies gives a true picture of injury because they do not compare the actual condition to a "without project" condition. We investigated making the "without project" comparison and concluded that there was not sufficient information available to make meaningful comparisons.

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[Pages 28-29]

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The array of studies run on the 1925-57 period show the impacts of the practices of transferring water out of the Model Right and storing winter water under the direct flow rights. The studies also show the impacts of various levels of over irrigation, project operation with a 39,000 acre-foot joint-use pool (instead of the 19,300 acre-foot pool used in the 1961-64 studies) and several levels of bypass to Ninemile and Highland. The studies show the impacts of individual practices and conditions and various combinations of practices and conditions. A description of the various studies was displayed earlier in this section on pages 17 through 20, and the results are shown in Table 5 and Table 6. Tables 5 and 6 show that under most of the practices and conditions studied, the inflow to John Martin Reservoir is larger than that which would have occurred without the Project. The increase of inflow is smaller, however, than would occur if the Project were operated as assumed in the 1961-64 studies.

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[Page 55]

V. CONCLUSIONS

A. The transfer of water from the model storage right to the joint-use pool is a departure from the intent of the Operating Principles.

B. The storage of winter water under the direct flow rights is also a departure from the intent of the Operating Principles.

C. The transfer of water from the Model Right and the storage of winter water under the direct flow rights during the 1979-84 review period has depleted the usable inflow to John Martin Reservoir when compared to the inflow that would have occurred had the Trinidad Project been in accordance with the intent of the Operating Principles.

D. The transfer of water from the Model Right and the storage of winter water under the direct flow decrees, either singularly or collectively, will not cause the future usable inflow to John Martin Reservoir to be less with Trinidad Project in operation than it would have been without the Project. These practices will, however, result in less inflow to John Martin Reservoir than would occur if the water rights were administered in accordance with the intent of the Operating Principles.

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Appendix Item 14

Excerpt from Jt. Ex. 34
House Document No. 325, 84th Cong.
2d Sess. (1956)

House Document No. 325, 84th Cong. 2d. Sess. (1956)
[Pages 3-4]

*****

The district engineer presents as the most suitable plan one providing for a dam and reservoir on the main stem of Purgatoire River at mile 161. The total storage capacity would be 140,700 acre-feet, of which 46,700 is allotted to flood control, 55,000 to conservation, and 39,000 to sediment control. He has coordinated the irrigation aspects of the plan with the Bureau of Reclamation. To obtain maximum beneficial use of the irrigation storage the Bureau of Reclamation suggests five basic operating conditions as follows:

(a) Transfer of the storage decree of the Model Land & Irrigation Co., for 20,000 acre-feet annually, from the present site to the proposed Trinidad Reservoir.

(b) Storage in Trinidad Reservoir of flood flows originating on Purgatoire River above the dam site which would otherwise spill from John Martin Reservoir.

(c) Storage in Trinidad Reservoir of the winter flows of Purgatoire River historically diverted for winter irrigation of project lands.

(d) Regulation in Trinidad Reservoir of summer flows historically diverted to project lands provided that future streamflow records disclose such further regulation would not materially decrease depletions or that any material increase in depletions be compensated by suitable replacement to lands served by John Martin Reservoir.

(e) Storage in Trinidad Reservoir of all flood flows originating on Purgatoire River above the reservoir other than those specified in condition *(b)*, provided that suitable replacement is made to John Martin Reservoir to the extent that such storage in Trinidad Reservoir would result in material depletion of the inflow from

Purgatoire River into John Martin Reservoir and interfere with its operation as established by the Arkansas River compact.
The district engineer states that operation of the irrigation capacity in accordance with conditions *(a)*, *(b)*, and *(c)* can be accomplished under existing Colorado law and the Arkansas River compact and will not significantly deplete the water supply presently available to water users downstream from the project area. He further states that the effects of the operation of the conservation capacity in accordance with conditions *(d)* and *(e)*, on the utilization of John Martin Reservoir for irrigation under the terms of Arkansas River compact are indeterminate from existing streamflow records.

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[Page 29]

97. Operation of the irrigation pool in the Trinidad Reservoir in accordance with the above conditions would require the complete cooperation of all water users in the project area, and the negotiation of suitable agreements and contracts to permit an equitable distribution of the project waters to the entire irrigated area in accordance with the crop requirements. Suitable arrangements may also have to be made with the water users served by the John Martin Reservoir under the terms of the Arkansas River compact if operation of the Trinidad project is to be accomplished under conditions *(d)* and *(e)* above.

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[Page 40]

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144. The chairman, and representative of the United States, Arkansas River Compact Administration, stated that additional supporting data would be needed to substantiate the conclusions

reached in the report before he deemed it advisable to submit specific comments and recommendations for official action by the administration.

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Appendix Item 15

Excerpt from Jt. Ex. 35

Flood Control Act of 1958, 72 Stat. 297

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Arkansas River Basin

The project for the Trinidad Dam on Purgatoire River, Colorado, is hereby authorized substantially in accordance with the recommendations of the Chief of Engineers in House Document Numbered 325, Eighty-fourth Congress, at an estimated cost of $16,628,000.

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Appendix Item 16

Jt. Ex. 44

Letter dated February 1, 1967, from H.P. Dugan, Director, Region 7, U.S. Bureau of Reclamation, to Governor Robert Docking of Kansas

A-85

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGIONAL OFFICE, REGION 7
BUILDING 20, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

IN REPLY
REFER TO: 7-440

Hon. Robert Docking
Governor of Kansas
Topeka, Kansas

FEB 1- 1967

Dear Governor Docking:

This is in reply to former Governor Avery's letter of December 30, 1966, to us concerning the operation of the proposed Trinidad Reservoir Project on the Purgatoire River near Trinidad, Colorado.

We are pleased to learn that the Kansas Water Resources Board, on the basis of our report on the irrigation function of the proposed Trinidad Project and additional information furnished by our representatives, has concluded essentially that the proposed Trinidad Project will not materially deplete the water supply of the Purgatoire River and John Martin Reservoir providing the project is operated in strict conformity with the guidelines used in the Trinidad Project investigations and the "Operating Principles" contained in the Bureau's Trinidad Irrigation Report.

We wish to assure you that the Bureau of Reclamation in its planning investigations for the proposed Trinidad Project and in developing the "Operating Principles" therefor has been fully aware of and has diligently and conscientiously endeavored to imple-

ment the provisions of the Arkansas River Compact so that the interests of the State of Kansas at all times will be fully protected consistent with the provisions of the Arkansas River Compact.

We appreciate the concern of the State of Kansas with the possibility that the Trinidad Project in its actual operation might have an adverse effect on Kansas and that provision should be made for timely adjustment of Trinidad Project operations to promptly eliminate any such adverse effects, should they occur. This legitimate concern is reflected in the five conditions set forth in former Governor Avery's letter with regard to future review and amendment, if necessary, of the "Operating Principles."

We have discussed this matter with the Board of Directors of the Purgatoire River Water Conservancy District. The Board is unanimous in its resolve that the five conditions in Governor Avery's letter are consistent with the Board's understanding of the "Operating Principles" and the manner of operation of the project as contemplated by the Board, and, further, that the Board approves those conditions to become operable when approved by the Regional Director, Bureau of Reclamation. A certified copy of the Board's January 27, 1967 resolution to that effect and a copy of District President James E. Donnelly's letter to us on this matter are enclosed.

The Bureau of Reclamation concurs fully in the enclosed resolution of the Board of Directors of the Purgatoire River Water Conservancy District and will be governed accordingly in implementing the "Operating Principles."

It would be greatly appreciated if your approval of the Trinidad Project can be received at an early date.

Sincerely yours,

H. P. Dugan
Director

Enclosures 2

Appendix Item 17

Jt. Ex. 45

Letter dated April 11, 1967, from Governor Robert Docking of Kansas to H.P. Dugan, Director, Region 7, U.S. Bureau of Reclamation

A-91

STATE OF KANSAS

OFFICE OF THE GOVERNOR

STATE CAPITOL BUILDING
TOPEKA, KANSAS

ROBERT B. DOCKING
GOVERNOR

April 11, 1967

Mr. H. P. Dugan
Bureau of Reclamation
Regional Office — Region 7
Building 46 — Federal Center
Denver, Colorado

Dear Mr. Dugan:

This will acknowledge receipt of your letters of February 1, 1967, and of March 20, 1967, and the Resolution from the Purgatoire River Water Conservancy District, Colorado.

I appreciate the consideration given by the Bureau of Reclamation and the Purgatoire River Water Conservancy District to the concern of the State of Kansas that the operation of the proposed Trinidad Project not adversely affect the volume of water flowing into John Martin Reservoir.

The resolution of the Purgatoire River Conservancy District dated January 26, 1967, together with the statement of the amended operating principles as contained in your letter of March 20, 1967, have been reviewed and found acceptable.

I, therefore, signify my approval of the amended operating principles referred to above, and offer no objection to the Trinidad Project being completed subject to the acceptance of the amended principles by the Arkansas River Compact Administration.

Sincerely,

Robert B. Docking
Governor

RBD:bj

cc: Mr. R. V. Smrha
Mr. Carl E. Bentrup
Mr. Logan N. Green
Mr. Felix L. Sparks
Mr. George F. Reyher
Mr. Ernest Hofmeister
Mr. Wilbur L. Heckler
Kansas Water Resources Board

Appendix Item 18

Excerpt from Jt. Ex. 99

U.S. Army Corps of Engineers, 1978, revised

1985, Water Control Manual, Trinidad Lake

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1-06. Regulating agencies. The operating principles for Trinidad Dam and Reservoir have been mutually agreed upon by the Corps of Engineers, Bureau of Reclamation, State of Colorado, Arkansas River Compact Administration, and the Purgatoire River Water Conservancy District. The project will be operated in such a manner as to secure the greatest practicable benefits from flood control, irrigation and recreation.

Appendix Item 19

Excerpt from R. vol. 15

October 18, 1990

(Direct Examination of Brent Spronk)

[Pages 132-34]

.....

SPECIAL MASTER: MR. SPRONK, I TAKE IT THAT THE EFFORT TO INTEGRATE WELLS INTO THE SURFACE WATER SYSTEM COULDN'T BE DONE ON AN ABSOLUTE PRIORITY KIND OF BASIS, COULD IT? IT WAS NOT DONE THAT WAY? WHAT IS GOING THROUGH MY MIND IS, WE LOOKED AT EXHIBITS EARLIER THAT INDICATED THAT IF YOU DIDN'T HAVE A PRIORITY BY 1890 OR SO, YOU WOULD BE OUT OF LUCK A GREAT DEAL OF THE TIME. OBVIOUSLY, ALL OF THE WELLS ARE GOING TO HAVE A MUCH LATER PRIORITY IF YOU ENFORCE THAT SYSTEM STRICTLY.

THE WITNESS: THAT'S A DILEMMA THAT COLORADO FOUND ITSELF IN, YOUR HONOR, TRYING TO FIT A SQUARE PEG IN A ROUND HOLE.

SPECIAL MASTER: WITHOUT GETTING INTO ANY LEGAL INTERPRETATIONS, WHAT DOES THE STATE ENGINEER DO, WHAT EXACTLY?

THE WITNESS: THE STATE ENGINEER ATTEMPTED TO ENACT RULES AND REGULATIONS AND ATTEMPTED TO, OVER TIME, CURTAIL OR REGULATE THE USAGE OF WELLS, THE THEN EXISTING WELLS, SO AS TO CURTAIL THEIR PUMPING AND CUT IT OFF OVER A PERIOD OF TIME. HE ULTIMATELY WAS NOT SUCCESSFUL IN WHOLE, BUT IN PART, IN THAT REGARD IN TERMS OF CURTAILING WELLS. THERE IS SOME EXCEPTIONS TO ALL OF WHAT I'M SAYING, HOWEVER, THOUGH, BEAR IN MIND.

SPECIAL MASTER: HE DID WHAT I WAS SUGGESTING, THAT THERE HAD TO BE SOME MODIFIED APPROACH TO THIS OR IT SEEMED TO ME THAT COLORADO'S PRODUCTION WOULD HAVE BASICALLY BEEN HALTED.

THE WITNESS: THERE WERE ATTEMPTS BY THE STATE ENGINEER TO ENACT, AS IS SAID, RULES AND REGULATIONS. THE ULTIMATE BOTTOM LINE, HOWEVER, YOUR HONOR, IS THAT THE WELLS CONTINUE — THAT WERE IN EXISTENCE CONTINUE TO OPERATE MORE OR LESS AS THEY DID BEFORE WITH VERY LITTLE, IF ANY, ACTUAL REPLACEMENT PROVIDED TO MAKE UP THE DEPLETIONS THAT WERE OCCURRING EVEN AS OF 1969 OR TODAY.

SPECIAL MASTER: NOW, THAT'S YOUR OPINION AS TO HOW WELLS ARE OPERATING TODAY.

THE WITNESS: THAT'S CORRECT, YOUR HONOR.

SPECIAL MASTER: SO YOUR OPINION IS THAT THEY'RE OPERATING BY AND LARGE WITHOUT LIMITATION —

THE WITNESS: THERE ARE SOME RULES AND REGULATIONS, BUT THEY OPERATE BY — BUT EFFECTIVELY THE IMPLEMENTATION OF THOSE RULES AND REGULATIONS ALONG WITH THE WRITTEN PLANS THAT THERE ARE EXCEPTIONS TO THE RULES AND REGULATIONS TO ALLOW THE WELLS TO BASICALLY OPERATE AS THEY WERE BEFORE THE 1969 ACT WITH AN EXCEPTION OF A SMALL AMOUNT OF REPLACEMENT WATER THAT THEY HAVE PROVIDED TO THE STREAM IN TERMS OF TRANSMOUNTAIN RETURN FLOWS.

SPECIAL MASTER: ALL RIGHT.

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Appendix Item 20

Excerpts from R. vol. 18

October 23, 1990

(Direct Examination of Brent Spronk)

[Pages 9-10]

.....

AFTER REVIEWING THE DOCUMENTS REGARDING THE BACKGROUND AND DEVELOPMENT OF THE TRINIDAD PROJECT, IT WAS CONCLUDED THAT THE CURRENT AND PAST OPERATION OF THE PROJECT IS NOT IN ACCORDANCE WITH THE OPERATING PRINCIPLES OF THE TRINIDAD DAM AND RESERVOIR PROJECT. THERE ARE TWO SIGNIFICANT DEVIATIONS FROM THE OPERATION OF THE PROJECT AS ORIGINALLY CONTEMPLATED BY THE BUREAU OF RECLAMATION WHO ARE THE AUTHORS OF THE OPERATING PRINCIPLES. THESE ARE 1, THE FACT OF TRANSFERS OR ROLLING OF THE CONTENTS OF THE IRRIGATION POOL INTO THE JOINT-USE POOL AND THEREBY ALLOWING AT TIMES MORE THAN 20,000 ACRE FEET TO BE STORED IN TRINIDAD RESERVOIR UNDER THE TRANSFERRED MODEL RIGHT.

"2, NOT COUNTING FOR THE STORAGE OF WINTER FLOW AS A PART OF THE 20,000 ACRE FEET OF STORAGE ALLOWED BY THE TRANSFERRED MODEL RIGHT.

"IN ESSENCE, IN 1984, I CONCLUDED, BASED ON MY INDEPENDENT REVIEW, THAT THOSE TWO PRACTICES WERE NOT IN ACCORDANCE WITH THE OPERATING PRINCIPLES. FOUR YEARS LATER IN THE BUREAU REPORT, THE SAME CONCLUSIONS ARE SET FORTH ON PAGE 55, UNDER ITEMS A AND B ON PAGE 55."

SPECIAL MASTER: MR. SPRONK, IN THAT PARAGRAPH 4.1.5, YOU ARE SAYING THAT THERE ARE TWO SIGNIFICANT DEVIATIONS, AND THEN YOU GO ON TO EXPLAIN THE ROLLOVER PROCEDURE WITH STORAGE OF WINTER FLOWS.

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[Pages 16-17]

.....

THE WITNESS: THE ADJUSTMENT OR THIS ADJUSTMENT FOR CONSERVATION POOL STORAGE RESULTS IN THE AMOUNT OF WATER WHICH WAS DEPLETED FROM THE CONSERVATION POOL STORAGE, 40 PERCENT OF WHICH WOULD BE ASSOCIATED WITH KANSAS ENTITLEMENT — OR UP TO 40 PERCENT WOULD BE ASSOCIATED WITH KANSAS ENTITLEMENT OF WATER FROM THE CONSERVATION POOL STORAGE.

WHAT I HAVE DONE IN THIS ILLUSTRATION IS TO TAKE THE MONTHLY ANALYSIS THAT I PERFORMED, SUMMARIZE IT IN AN ANNUAL BASIS AS THE BUREAU DID IN THEIR TABLE 4 ON PAGE 16 OF JOINT EXHIBIT 23 SO THAT THESE NUMBERS FOR BOTH CASES 1 AND 2 UNDER THE COLUMNS DEPLETION THROUGH THE CONSERVATION POOL STORAGE DEPICT —

MR. DRAPER: IS THAT CASES 1 AND 2?

THE WITNESS: 1 AND 3. I'M SORRY.

— DEPICT THE QUANTITIES OF WATER DEPLETED FROM THE CONSERVATION POOL STORAGE — TO THE CONSERVATION POOL STORAGE AS A RESULT OF A DEPARTURE FROM THE OPERATING PRINCIPLES AT TRINIDAD RESERVOIR.

SPECIAL MASTER: BASED ON THE CONDITIONS THAT YOU HAVE JUST DESCRIBED?

THE WITNESS: THAT IS CORRECT.

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[Page 46]

THIRDLY, COLORADO HAS NOT EFFECTIVELY ADMINISTERED THE WATERS OF THE ARKANSAS RIVER TO PROTECT SURFACE WATER USERS, INCLUDING THE STATE OF KANSAS FROM THE USE OF GROUND WATER WITHIN THE ARKANSAS BASIN.

THE HISTORY OF WELL ADMINISTRATION OR LACK THEREOF IS BORNE OUT BY NO ATTEMPTS TO ADMINISTER GROUND WATER USAGE BEFORE 1965 AND AFTER THE 1965 GROUND WATER ACT, WHICH IS COLORADO EXHIBIT 378. THE ATTEMPT TO SHUT DOWN SOME WELLS RESULTED IN FAILURE BECAUSE THE ACTIONS WERE NOT PROPERLY UNDERTAKEN. I REFER THE COURT TO THE *FELLHAUER* CASE, WHICH IS COLORADO EXHIBIT 384.

THE CURRENT RULES AND REGULATIONS — IN OTHER WORDS, THE 1973 RULES AND REGULATIONS — THAT ARE IN EFFECT IN THE ARKANSAS BASIN ARE BASICALLY INEFFECTIVE IN CONTROLLING THE USE AND PUMPAGE BY EXISTING WELLS RESULTING IN NO REDUCTIONS IN PUMPING, AND THEY DO NOT PROVIDE AN ADEQUATE MEANS TO FULLY REPLACE THE STREAM DEPLETIONS CAUSED BY THESE WELLS, SPECIFICALLY THE WRITTEN PLANS THAT HAVE BEEN APPROVED AND USED BY EITHER THE — BY COLORADO OR THE LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION AND THE COLORADO WATER PROTECTIVE AND DEVELOPMENT ASSOCIATION ARE INEFFECTIVE IN REPLACING ALL STREAM DEPLETIONS.

.....

Appendix Item 21

Excerpts from R. vol. 53

February 13, 1991

(Cross-examination of Timothy Durbin)

[Pages 143-146]

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Q. NOW, LOOKING AT THE MONTHS OF DECEMBER, 1950 THROUGH MARCH, 1951, THE HYDROLOGIC-INSTITUTIONAL MODEL CALCULATES NET DEPLETIONS OF STATE LINE FLOWS; IS THAT CORRECT?
A. WHICH PERIOD ARE WE LOOKING AT NOW?
Q. DECEMBER, 1950 THROUGH MARCH, 1951.
A. DECEMBER, 1950 —
Q. WHICH IS COMPACT YEAR 1951. SO IT IS DECEMBER — SO WE ARE TALKING ABOUT DECEMBER WHICH IS THE NEXT MONTH. IT IS UNDER COMPACT YEAR 1951, DECEMBER, '51, WHICH IS ACTUALLY DECEMBER, 1950.
A. OKAY.
Q. THROUGH MARCH OF 1951. THE HYDROLOGIC-INSTITUTIONAL MODEL IN EACH OF THOSE MONTHS, THE NEXT FOUR MONTHS, CALCULATES A NET DEPLETION OF STATE LINE FLOWS; IS THAT RIGHT?
A. THAT'S CORRECT.
Q. IN COMPARISON F.

THE MODEL ALSO CALCULATES DEPLETIONS OF USABLE STATE LINE FLOWS IN THOSE MONTHS AS WELL; IS THAT CORRECT?

A. YES.
Q. NOW LOOKING BACK AT TABLE 7A OF PLAINTIFF'S EXHIBIT 327, WHICH WAS THE SPRONK WATER ENGINEER'S MEMO, DOES IT MAKE SENSE TO YOU THAT WELL PUMPING IN COLORADO DEPLETED USABLE STATE LINE FLOW DURING THE PERIOD NOVEMBER, 1950 THROUGH MARCH, 1951, WHEN THE KANSAS DIVERSIONS DURING THAT PERIOD WERE ONLY 22 PERCENT OF THE STATE LINE

FLOWS AND THE UNUSED FLOW AT GARDEN CITY EXCEEDED THE FLOW AT THE STATE LINE?

A. YES, IT DOES.

Q. TO DETERMINE — WHY DOES THAT MAKE SENSE TO YOU?

SPECIAL MASTER: YOU ARE GOING TO ASK THAT DANGEROUS QUESTION?

MR. ROBBINS: YES, SIR.

THE WITNESS: IT MAKES SENSE TO ME, BECAUSE A CHANGE IN STATE LINE FLOWS RESULTS IN A CHANGE IN DIVERSIONS AND IT ALSO RESULTS IN A CHANGE IN GROUND WATER RECHARGE. AND THOSE TWO THINGS TOGETHER CONSTITUTE WHAT IS A CHANGE IN USABLE FLOW.

BY MR. ROBBINS:

Q. BUT LOOKING AT THE DIVERSIONS IN 1951 DURING THAT TIME, THEY ONLY DIVERTED 22 PERCENT OF THE WATER, DIDN'T THEY?

A. IF THE DATA IN 7A APPROPRIATELY REPRESENTS WHAT ACTUALLY OCCURRED.

Q. DO YOU HAVE ANY REASON TO DOUBT THAT THE DATA SHOWN IN 7A ARE ACCURATE?

A. NO.

Q. SO IN 1951, DURING THAT PERIOD THEY ONLY TOOK 22 PERCENT OF THE FLOW; RIGHT?

A. RIGHT. BUT IF THERE WAS MORE, THEY WOULD HAVE DIVERTED MORE. THAT IS THE UNDERLYING BASIS OF THE USABLE FLOW CALCULATIONS.

Q. WELL, NOW THERE WAS 52,000 ACRE FEET AT THE STATE LINE AND THE DIVERSIONS WERE 11,000, WHAT MAKES YOU SAY THAT IF THERE WAS MORE THEY WOULD HAVE TAKEN MORE? THERE WAS AT LEAST 40,000 MORE THERE AS IT WAS THAT THEY DIDN'T TAKE.

A. BECAUSE THEIR AVERAGE BEHAVIOR IS THAT REGARDLESS OF WHAT THEY'RE ACTUALLY DIVERTING AND WHAT IS AVAILABLE THAT IF MORE FLOW IS AVAILABLE, THEY WILL TEND TO DIVERT MORE.

Q. SO —

SPECIAL MASTER: MR. DURBIN, LOOKING AT PLAINTIFF'S EXHIBIT 327, TABLE 7A, THIS IS A TABLE PREPARED FROM ACTUAL MEASUREMENTS, IT HAS NOTHING TO DO WITH THE MODEL?

THE WITNESS: IT HAS NOTHING TO DO WITH THE MODEL. THESE ARE ACTUAL DATA.

SPECIAL MASTER: SO YOU HAVE BEEN LOOKING AT THE YEAR 1950, '51. YOU CAN LOOK AT A NUMBER OF YEARS WHERE PERCENTAGE OF DIVERSION OF STATE LINE FLOWS IS FAIRLY LOW. WHY DOES THAT OCCUR? THEY WANT TO HAVE AS MUCH CANAL WATER OR RIVER WATER AS THEY CAN GET. WHY WOULD IT BE, PERCENTAGE FIGURES THAT ARE DOWN TO 18 PERCENT, 7 PERCENT, 17 PERCENT, 5 PERCENT AND SO ON?

THE WITNESS: BUT ON THE AVERAGE —

SPECIAL MASTER: I GUESS I'M LOOKING AT WINTER. I SHOULDN'T BE DOING THAT.

THE WITNESS: I THINK THAT'S WHAT MR. ROBBINS HAS US EXAMINING NOW IS THE WINTERTIME.

SPECIAL MASTER: OKAY. I UNDERSTAND IF IT IS WINTER, IT WOULD MAKE A DIFFERENCE. I WAS THINKING THAT WAS A YEARLY PERCENTAGE.

BY MR. ROBBINS:

Q. I'M STILL UNCLEAR. FOR EXAMPLE, IN A YEAR LIKE 1960, WHEN THERE IS APPROXIMATELY 60,000 ACRE FEET AT THE STATE LINE AND KANSAS ONLY TOOK 4,000 ACRE FEET, WHY IF THERE WERE MORE WATER KANSAS WOULD TAKE MORE. THEY PASSED, YOU KNOW, 55,000 ACRE FEET.

A. I THINK THAT IT'S EASIER TO SEE THIS IF WE EXAMINE, FIRST OF ALL, THE SUMMERTIME.

Q. WE CAN LOOK AT THE SUMMER IN TIME. BUT I WANT TO UNDERSTAND IN THE WINTER. YOU SAID THAT UNDER NO CIRCUMSTANCES WOULD A DEPLETION IN STATE LINE FLOWS NOT RESULT IN INJURY TO THE KANSAS WATER USERS, AND I'M INTERESTED, BECAUSE YOU SAY THAT IF THERE IS MORE WATER THEY DIVERT MORE.

A. THAT IS CORRECT.

Q. I'M CURIOUS WHY, FOR EXAMPLE, IN 1960, THERE IS 60,000 ROUND NUMBERS ACRE FEET AT THE STATE LINE, THEY TOOK JUST A LITTLE OVER 4,000, THERE IS 70,000 PASSING GARDEN CITY, AND YOU SAY THAT THERE IS NO WATER THAT COULD BE DEPLETED AT THE STATE LINE WITHOUT DEPRIVING KANSAS WATERS USERS OF USABLE FLOWS?

.....

[Pages 148-149]

.....

SPECIAL MASTER: MR. DURBIN, LET'S STEP AWAY FOR A MINUTE FROM THE REGRESSION TABLES AND SORT OF ADDRESS MR. ROBBINS'S POINT IN MORE GENERAL TERMS. HE'S SUGGESTING THAT ANY GIVEN YEAR — AND HE'S USING 1950, '51 AS AN EXAMPLE, BUT I THINK YOU COULD FIND SOME OTHER YEARS THAT WOULD BE SIMILAR — IN ANY GIVEN YEAR, KANSAS IS NOT — JUST STAY WITH THE WINTER FOR JUST A SECOND — KANSAS IN THE WINTERTIME IS NOT DIVERTING BUT SOME FRACTION OF WATER THAT IS AVAILABLE AT THE STATE LINE. AND ASSUMING THAT WE ARE NOT HITTING ONE OF THESE CAPS SO THAT IT BECOMES UNUSABLE, AND THESE CHARTS ALSO INDICATE THAT IN SOME OF THESE SAME YEARS THAT WE ARE LOOKING AT THERE IS ALSO WATER PASSING

GARDEN CITY, HE'S SAYING THAT AT LEAST IN THOSE WINTER MONTHS SHOULDN'T COLORADO PEOPLE BE ABLE TO TAKE MORE WATER — IT SAYS PUMPING, I PRESUME IT COULD BE TAKEN IT ANYWAY — WITHOUT INJURY, THE IDEA BEING THAT IF YOU REDUCE THE STATE LINE FLOWS, IT STILL ISN'T GOING TO MAKE ANY DIFFERENCE, BECAUSE KANSAS ISN'T TAKING ALL OF THE STATE LINE FLOWS THAT ARE THERE. NOW, I THINK IN GENERAL THAT IS THE POINT THAT HE'S TRYING TO MAKE.

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Appendix Item 22

Excerpt from R. vol. 54

February 14, 1991

(Direct Examination of Jeffrey Lefkoff)

[Pages 122-23]

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BY MR. DRAPER:

Q. ARE YOU ABLE TO CATCH — IN THE ADMINISTRATIVE MODULE DAILY TIME STEP, DOES THAT ALLOW YOU TO CAPTURE THE DAILY FLUCTUATIONS IN THE STREAMFLOW?

A. YES. THAT IS THE REASON FOR USING A DAILY TIME STEP IN THE ADMINISTRATIVE MODULE. THERE ARE SOMETIMES SIGNIFICANT DAY-TO-DAY FLUCTUATIONS IN STREAMFLOW. AND THAT OBVIOUSLY IS THE WAY THEY CALL AND SO BY BASING THE ADMINISTRATIVE MODULE ON A DAILY TIME STEP, THE MODEL IS ABLE TO CAPTURE THOSE INTRAMONTH FLUCTUATIONS, BOTH IN STREAMFLOW AND IN DIVERSIONS THAT WOULD OCCUR.

Q. AND DOES THAT ALSO APPLY TO RESERVOIR RELEASES?

A. YES.

Q. ARE THEY DONE ON A DAILY BASIS, ALSO?

A. YES, THAT IS RIGHT.

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[Page 125]

.....

A. . . . .

DAILY STREAMFLOW, WHICH I DISCUSSED A MOMENT AGO, IS ALSO READ IN. THAT IS DAILY STREAMFLOW AT — ON THE MAIN STEM OF THE ARKANSAS RIVER AT PUEBLO, AND ON THE PURGATOIRE AT LAS ANIMAS.

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Appendix Item 23

Excerpt from R. vol. 82

May 22, 1991

(Direct Examination of Duane Helton)

[Page 139]

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BY MR. ROBBINS:

Q. MR. HELTON, WHY IS THE PRE-COMPACT PUMPING FOR THE YEARS '40 TO '49 LESS IN SOME INSTANCES THAN THE PUMPING ATTRIBUTABLE TO THE PRE-COMPACT WELLS AFTER 1950?

A. BECAUSE OF THE SURFACE WATER SUPPLY THAT WAS AVAILABLE, YOUR HONOR.

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Appendix Item 24

Excerpt from R. vol. 89

February 25, 1992

(Direct Examination of Brent Spronk)

[Pages 40-50]

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BY MR. DRAPER:

Q. MR. SPRONK, WOULD YOU DESCRIBE THE CRITERIA WHICH YOU EMPLOYED IN DETERMINING USABLE STATE LINE FLOWS?

A. THE CONSIDERATIONS I GAVE WERE SEVERAL FOLD. ONE OF THE THINGS THAT I LOOKED AT IS WHETHER OR NOT THE — WHAT AMOUNTS WERE BEING REQUESTED FOR DELIVERY BY KANSAS OF STORED WATER IN JOHN MARTIN WAS MORE OR LESS THAN WHAT WAS ACTUALLY BEING DELIVERED TO THE STATE LINE.

ANOTHER THING THAT I LOOKED AT WAS WHETHER THE STREAMFLOWS BETWEEN THE STATE LINE AND GARDEN CITY WERE AFFECTED BY RAINFALL EVENTS, MAJOR RAINFALL EVENTS. AND THAT WAS INDICATED BY THE DAILY PRECIPITATION RECORDS THAT I UTILIZED—HAD AVAILABLE TO ME. I BASICALLY LOOKED AT JUST EVENTS THAT WERE IN TERMS OF THE AMOUNT OF WATER ON A DAILY BASIS OF RAINFALL, THAT IS ONE INCH PER DAY. I LOOKED AT THOSE LARGE RAINFALL EVENTS AND OBSERVED THE CHANGES IN FLOW AND WHAT CHANGES IN FLOW EXISTED AS A RESULT.

I ALSO CONSIDERED WHETHER OR NOT THE FRONTIER DITCH, WHICH IS THE UPPERMOST DITCH, MOST UPSTREAM DITCH OF THE KANSAS DITCHES, WHETHER IT DIVERTED ALL OR ESSENTIALLY ALL OF THE FLOW AVAILABLE AT THE STATE LINE. AND THERE ARE A FEW OCCASIONS IN THE DRY YEARS WHERE ESSENTIALLY ALL OF THE FLOWS WERE BEING DIVERTED BY THE

FRONTIER DITCH. THAT, FOR INSTANCE, WOULD INDICATE THAT OBVIOUSLY MORE WATER COULD BE USED BY THE OTHER DITCHES.

THE OTHER CONSIDERATIONS WERE WHETHER THE — WHAT I HAVE REFERRED TO AS THE UPPER GARDEN CITY DITCHES, WHETHER THEIR DIVERSIONS ARE MADE UP OR ESSENTIALLY TOOK ALL OF THE RIVER FLOW AS WAS RECORDED AT SYRACUSE. THE UPPER DITCHES, AS THE WAY I HAVE COMBINED THEM, CONSIST OF THE AMAZON DITCH, THE GREAT EASTERN DITCH, AND THE SOUTHSIDE DITCH. AS YOU CAN SEE FROM KANSAS EXHIBIT 20, THOSE ARE THE LOWER THREE—EXCUSE—THOSE ARE THE MIDDLE THREE DITCHES. THERE IS STILL ONE DITCH BELOW THAT, ONE HEAD GATE BELOW THAT, FARMERS DITCH AND GARDEN CITY DITCH. THEY ACTUALLY NOW DIVERT AT A COMMON HEAD GATE. THE UPPER GARDEN CITY DITCHES, THE WAY I DEFINED THEM ARE THE AMAZON DITCH AND THE GREAT EASTERN DITCH, AND THE SOUTHSIDE DITCH.

AND I TOTALLED THOSE DAILY DIVERSIONS AGAIN ON A DAILY BASIS AND COMPARED THOSE WITH THE FLOWS AVAILABLE AT SYRACUSE. AND IF THE ACCUMULATED DIVERSIONS WERE SIGNIFICANTLY GREATER THAN THE FLOW AT SYRACUSE, THEN I CONSIDERED THAT WAS PROBABLY A DAY THEY WERE USING ALL OF THE WATER THAT WAS AVAILABLE TO THEM.

FINALLY—EXCUSE ME, THERE ARE TWO MORE CRITERIA.

YOU WILL RECALL THAT THERE WERE—THAT I MENTIONED EARLIER THERE WERE STREAMFLOW RECORDS ON A DAILY BASIS FOR SOME OF THE INTERVENING DITCHES BETWEEN THE STATE LINE AND GARDEN CITY. THE SYRACUSE GAUGE, FOR INSTANCE, THERE WAS A CONTINUOUS RECORD OVER THE WHOLE PERIOD. AT THE OTHER DITCHES, THERE ARE VARYING RECORDS. MOST OF THEM HAVE RECORDS DURING THE LATE '70'S AND EARLY '80'S. THE DAILY AMOUNTS OF FLOW RECORDED AT THOSE GAUGES WERE ALSO UTILIZED FOR THEIR PERIOD OF RECORD. THOSE GAUGES INDICATE THAT THE FLOWS AT TIMES ESSENTIALLY WERE ZERO THERE, ALSO, WERE VERY LOW AT POINTS. AND WHEN THE RIVER DRIED UP AT ONE OF THESE POINTS, IT WAS AN INDICATOR TO ME THAT THEN ALL OF THE WATER THAT WAS THEN AVAILABLE AT THE STATE LINE WAS BEING UTILIZED.

THE CRITERIA THAT I ACTUALLY APPLIED WASN'T A ZERO FLOW, IT WAS 5 CFS AT THOSE GAUGES. SO IF THE FLOW AT THE GAUGES WERE 5 CFS OR LESS, IN MY OPINION, ESSENTIALLY THE RIVER WAS BEING FULLY UTILIZED. THE 5 CFS, I MIGHT ADD, WOULD ACCOUNT FOR RETURN FLOWS OR TRIBUTARY INFLOWS BETWEEN THE GAUGE AND PROBABLY THE POINT OF DIVERSION UPSTREAM. AND I MIGHT ALSO REFLECT THE FACT THAT NOT ALL OF THE FLOWS, 100 PERCENT OF THE FLOWS CAN BE EFFECTIVELY DIVERTED BY THE RIVER HEAD GATE. AT TIMES YOU CAN HAVE LEAKAGE AND UNDER FLOW AROUND THE GAUGE AND THERE WILL BE SOME SMALL AMOUNTS, PARTICULARLY WHEN YOU ARE DEALING WITH A WIDE RIVER CHANNEL.

FINALLY, THE LAST CRITERIA THAT I UTILIZED IN THE DAILY FLOW ANALYSIS WAS WHETHER THE FLOW AT THE GARDEN CITY GAUGE WAS LESS THAN A SPECIFIED AMOUNT. AGAIN, THE GARDEN CITY GAUGE REPRESENTS SORT OF THE BOTTOM END OF THE SYSTEM THAT I LOOKED AT. IT IS LO-

CATED ON KANSAS EXHIBIT 20, AND IS ABOUT 13 MILES BELOW THE LAST DITCH DIVERSION, THAT BEING THE FARMERS DITCH AND GARDEN CITY DITCH DIVERSION DAM.

THE FLOW RATES WHICH I UTILIZED FOR THE GARDEN CITY GAUGE ACTUALLY VARIED OVER TIME. THEY WERE ON THE AMOUNT OF 20 CFS FOR THE TIME PERIOD OF 1950 THROUGH '72, AND 5 CFS STARTING IN U.S.G.S. WATER YEAR 1973.

THE REASON FOR THE DECREASE IN THE MIDDLE OF MY STUDY WAS TO ACCOUNT FOR SOME OF THE DISCHARGES THAT OCCURRED THROUGH THE GARDEN CITY POWER PLANT AND BEET PLANT, THAT I BELIEVE THERE HAS BEEN SOME TESTIMONY ABOUT PREVIOUSLY IN THIS CASE. THE 15 CFS CHANGE MORE OR LESS REPRESENTS AN AMOUNT TO ACCOUNT FOR THAT DISCHARGE.

THE DISCHARGE CEASED IN AND AROUND THE EARLY '70'S. I THINK ACTUALLY IN '75 OR '76, THEREABOUTS. BUT IT DECLINED SLOWLY IN THE EARLY '70'S. THAT IS WHY I CUT IT OFF A COUPLE OF YEARS EARLIER.

SPECIAL MASTER: YOU USED 5 CFS BEGINNING IN 1973 AND UNTIL WHAT YEAR?

THE WITNESS: THAT WAS UTILIZED UNTIL THE END OF THE STUDY PERIOD, UNTIL 1985. PRIOR TO THAT, 20 CFS WAS EMPLOYED.

WHENEVER THE FLOW THAT WAS RECORDED BY THE U.S.G.S. SURVEY, OR BASED ON THE ESTIMATE THAT I OBTAINED FROM THE DIVISION OF WATER RESOURCES FROM 1970 THROUGH '85, WAS BELOW THESE AMOUNTS, THEN I CONSIDERED ALL OF THE FLOW THEN OCCURRING AT THE STATE LINE TO BE USABLE.

SPECIAL MASTER: AND IF THE FLOWS WERE ABOVE THOSE AMOUNTS, YOU CONSIDERED THEM NOT TO BE USABLE?

THE WITNESS: YES. I CONSIDERED ANY ADDITIONAL FLOWS THAT WOULD OCCUR AT THE STATE LINE WOULD NOT BE USABLE.

I THINK THAT SUMMARIZES THE GENERAL CRITERIA THAT I APPLIED.

AND THE MANNER IN WHICH I APPLIED THIS CRITERIA WAS TO LOOK AT EVERY DAY IN THE STUDY PERIOD, 1950 THROUGH '85, TO MAKE A DECISION, USING THE DATA THAT WAS AVAILABLE THAT I DESCRIBED AND THESE GENERAL CRITERIA TO JUDGE WHETHER IN MY OPINION ON THAT DAY MORE WATER COULD HAVE BEEN USED OR NOT. IN LOOKING AT, OBVIOUSLY MANY DAYS, AND I DON'T HAVE THE NUMBER IN FRONT OF ME, BUT EACH DAY FROM 1950 THROUGH 1985.

BY MR. DRAPER:

Q. SO HOW DID YOU ACTUALLY GO ABOUT APPLYING THE CRITERIA? DID YOU HAVE A SPREAD SHEET THAT CONTAINED ALL OF THIS INFORMATION?

A. IN ORDER TO LOOK AT THE DATA ON A DAY-BY-DAY BASIS, I DID PUT IT INTO A SPREAD SHEET WHICH WOULD ILLUSTRATE THE DATA AND SOME VARIOUS CALCULATIONS, UTILIZING THE DATA TO HELP INDICATE WHETHER NOT ON A GIVEN DAY WHETHER ALL OF THE FLOW WAS BEING USED. AND AN EXAMPLE OF THAT KIND OF SPREAD SHEET IS EXHIBIT 645.

Q. ALL RIGHT. LET'S TAKE A LOOK AT THAT EXHIBIT, IF YOU WOULD, PLEASE.

A. EXHIBIT 645 IS A SERIES OF 12 TABLES. ONE TABLE—OR ONE PAGE, THAT IS—FOR EACH MONTH DURING THE YEAR 1955. THIS IS A SAMPLE YEAR. THERE ARE ACTUALLY A SIMILAR SET OF PAGES OR

TABLES FOR EVERY OTHER MONTH IN THE STUDY PERIOD 1950 THROUGH 1985. EACH PAGE REPRESENTS ONE MONTH AND HAS THE DAILY VALUES OF THE DATA THAT I DESCRIBED DEPICTED ON IT. THE COLUMNS INDICATE, FOR INSTANCE, THE STATE LINE FLOW. IT ALSO INDICATES WHEN KANSAS IS CALLING FOR WATER, AND WHEN IT IS CALLING, THAT WOULD BE THE FOURTH COLUMN OVER LABELED "KANSAS CALL W/3 DAY LAG." I INCORPORATED A THREE-DAY LAG FOR—TO ADD ONTO THE CALLS TO TAKE INTO ACCOUNT THE TRANSIT TIME BETWEEN JOHN MARTIN AND THE STATE LINE.

THE SECOND COLUMN INDICATES WHETHER THE STATE LINE FLOW WAS IN EXCESS OR SHORTAGE OF THE—LET ME BACK UP. THE SECOND COLUMN OF NUMBERS OTHER THAN THE DAYS IS ENTITLED "EXCESS/SHORTAGE STATELINE FLOW." THAT REPRESENTS THE EXCESS OF SHORTAGE OF THE STATE LINE FLOW AS COMPARED TO THE KANSAS CALL.

NOW, THIS FIRST SHEET, OBVIOUSLY, IS IN OCTOBER AND THE ASTERISKS IN THE THIRD COLUMN WHERE THE COLUMN LABELED "KANSAS CALL W/3 DAY LAG" INDICATE THAT THE RESERVOIR WAS EMPTY ON THOSE DAYS. IF THERE IS AN "N/A" INSIDE OF THAT COLUMN, IT WOULD INDICATE THERE WAS WATER IN THE RESERVOIR, BUT IT WASN'T BEING CALLED THAT DAY.

Q. YOU ARE REFERRING TO THE FIRST PAGE OF EXHIBIT 645?

A. YES, THANK YOU.

MOVING FURTHER OVER IN THE SPREAD SHEET, YOU WILL SEE THAT THERE ARE DAILY VALUES REPORTED FOR SYRACUSE FOR THE GARDEN CITY GAUGE. I ALSO HAVE A COLUMN THERE, WHAT IS

THE FLOW AT GARDEN CITY WHEN KANSAS IS DEMANDING WATER FROM JOHN MARTIN. AND IT WOULD INDICATE A VALUE IN THAT COLUMN, A NUMERICAL VALUE IF THERE WAS A CALL ON ANY GIVEN DAY.

Q. THE COLUMN ENTITLED "FLOW AT GARDEN CITY," IS THAT THE INFORMATION FROM KANSAS EXHIBIT 644?

A. YES, THANK YOU. IF YOU COMPARE 644 FOR THE YEAR 1955, WATER YEAR 1955, THE NUMBERS IN THAT COLUMN WILL BE IDENTICAL TO THE ONES IN 644. 644 WAS THE COMPILATION OF DAILY FLOWS JUST AT GARDEN CITY.

SPECIAL MASTER: LET'S JUST TAKE A LOOK AT THAT COLUMN FOR A SECOND.

THE WITNESS: SURE.

SPECIAL MASTER: USING YOUR 20 CFS CRITERIA, THIS WOULD INDICATE THAT THE ONLY TIME THAT WAS EXCEEDED WAS ON THE 28TH AND 29TH OF THE MONTH WHERE IT WAS 22 CFS. IF YOU GO BACK TO THE STATE LINE FLOWS, THEY ARE 42 AND 41 ON THOSE TWO DAYS. THIS IS MAYBE TOO SMALL A CHANGE TO BE USING AS AN EXAMPLE, BUT I GUESS I DON'T QUITE UNDERSTAND THEN WHAT THE RELATIONSHIP WOULD BE. YOU INDICATED THAT IF MORE THAN 20 CFS DURING THIS PERIOD OF TIME WAS PASSING GARDEN CITY THAT YOU WOULD NOT CALL FOR ADDITIONAL FLOWS. SO DO YOU THEN CONSIDER THAT PART OF THE 42 AND 41 IS NOT USABLE?

THE WITNESS: YOUR HONOR, IF YOU LOOK OVER FURTHER TO THE RIGHT-HAND SIDE OF THE SPREAD SHEET, THERE IS A COLUMN LABELED "SWE USABLE FLOW?"

SPECIAL MASTER: YES.

THE WITNESS: WITH A ZERO EQUALLING "NO" AND A 1 EQUALING "YES." YOU WILL SEE THAT FOR THIS PARTICULAR MONTH, THE FIRST MONTH DEPICTED IN EXHIBIT 645, OCTOBER 1955, THAT ALL OF THE DAYS WERE IDENTIFIED AND DETERMINED TO BE DAYS WHEN ALL OF THE FLOW WAS USED WITH THE EXCEPTION OF THE DAYS FOLLOWING THE 25TH OF OCTOBER AND ON. ALL OF THOSE DAYS WERE NOT DAYS WHEN IN MY JUDGMENT THE FLOW WAS ALL USED. BUT FOR THE FIRST 24 DAYS OF THE MONTH. I DID CONSIDER THAT ALL OF THE FLOW WAS BEING USED.

I HAVE ANOTHER EXAMPLE WE WILL WORK THROUGH THAT MIGHT ANSWER SOME MORE OF YOUR QUESTIONS—

SPECIAL MASTER: ALL RIGHT.

THE WITNESS: —ABOUT HOW THE CRITERIA APPLY.

SPECIAL MASTER: ALL RIGHT.

THE WITNESS: BUT I DON'T KNOW IF YOU WOULD LIKE ME TO DO THAT FIRST OR FINISH THE DESCRIPTION OF THIS TABLE.

SPECIAL MASTER: WHY DON'T YOU FINISH THE DESCRIPTION FIRST?

THE WITNESS: OKAY.

SPECIAL MASTER: THEN LET'S COME BACK TO THIS.

THE WITNESS: THERE ARE COLUMNS FOR EACH OF PRECIPITATION GAUGES AND THEY INDICATE THE—THE VALUES INDICATE WHEN PRECIPITATION OCCURRED AND THE AMOUNT IN EXCESS OF ONE INCH PER DAY. SYR WOULD BE AN ABBREVIATION FOR SYRACUSE, G.C. WOULD BE AN ABBREVIATION FOR GARDEN CITY, AND LAK IS AN ABBREVIATION FOR THE LAKIN PRECIPITATION GAUGE.

BY MR. DRAPER:

Q. DOES THE .1 THAT APPEARS FOR THE 7TH OF THE MONTH INDICATE .1 INCH RAIN OR 1.1?

A. 1.1.

Q. SO THAT IS THE NET—

A. CORRECT.

THE NEXT SET OF COLUMNS WOULD BE ASSOCIATED WITH KANSAS—DAILY KANSAS DITCH DIVERSIONS. THEY ARE LUMPED INTO FOUR DIFFERENT CATEGORIES, THE FIRST CATEGORY BEING THE STATE LINE TO SYRACUSE DIVERSIONS. AND THEY WOULD INCLUDE THE FRONTIER, HOWITT, AND FORT AUBREY DITCH DIVERSIONS.

THE NEXT COLUMN, SYRACUSE TO SOUTH SIDE, WOULD BE THAT REACH OF STREAM THAT INCLUDES THE AMAZON, GREAT EASTERN AND SOUTH SIDE DITCH DIVERSIONS, IN OTHER WORDS, THE UPPER GARDEN CITY DIVERSIONS AS I HAVE DEFINED THEM EARLIER.

FINALLY, THE LAST COLUMN LABELED "BELOW SOUTH SIDE TO GAR. CITY" WOULD INCLUDE THE FARMERS AND GARDEN CITY DITCHES AND THEIR DIVERSIONS.

THE THREE DIFFERENT CATEGORIES ARE THEN ADDED UP IN THE TOTAL—DAILY KANSAS DITCH DIVERSIONS ARE ILLUSTRATED IN THE TOTAL COLUMN UNDER THE "KANSAS DITCH DIVERSION" HEADING.

FINALLY, THERE ARE SOME NET GAIN AND LOSS COLUMNS, WHICH TAKE INTO ACCOUNT THE GAUGE FLOWS AND THE DIVERSIONS IN BETWEEN THOSE GAUGES TO DETERMINE IS THERE A LOSS OR A GAIN IN THAT REACH DURING THAT PARTICULAR DAY.

THE NEXT COLUMN IS THE SYRACUSE LESS UPPER GARDEN CITY DITCH DIVERSIONS AS A INDI-

CATOR OF WHAT WAS GOING ON THAT DAY IN RELATION TO THE ACCUMULATED DIVERSIONS FOR THE UPPER GARDEN CITY DITCHES AS OPPOSED TO THE SYRACUSE. IT WOULD REPRESENT, FOR INSTANCE, ON THE FIRST DAY—OR ON ALL OF THE DAYS IT WOULD BE THE SYRACUSE FLOW LESS THE COLUMN LABELED "SYRACUSE MINUS SOUTHSIDE KANSAS DITCH DIVERSIONS."

THE NEXT TWO COLUMNS INDICATE THE AMOUNT—OR SW USABLE FLOW QUESTION MARK INDICATES WHETHER IN FACT THAT DAY IN MY JUDGMENT WAS A DAY WHEN ALL OF THE FLOW WAS USED OR NOT. AND THE USABLE STATE LINE FLOW AMOUNT JUST CARRIES OVER THE FULL AMOUNT OF THE STATE LINE FLOW WHENEVER A 1 APPEARS IN THE PRIOR COLUMN. AND A ZERO, OF COURSE, WAS FOR THOSE DAYS WHEN A ZERO WAS RECORDED AT THE PRIOR COLUMN. AS AN EXAMPLE, THE FIRST DAY A 1 APPEARS SO THERE IS 27 CFS. IF YOU LOOK OVER TO THE STATE LINE FLOW COLUMN ON THE LEFT-HAND SIDE OF THE PAPER, THERE WAS 27 CFS AT THE STATE LINE.

LIKEWISE, LET'S LOOK AT THE 31ST DAY OF THE MONTH, AND YOU WILL SEE THAT THERE WAS—THERE WAS NO—THERE WAS SOME FLOW THAT WASN'T USABLE, I GUESS IS THE BEST WAY TO PUT IT ON THAT DAY, IN MY JUDGMENT. THEREFORE, THE USABLE STATE LINE AMOUNT, I JUST PUT ZERO IN THERE. SO IT WAS PLUS OR MINUS—I MEAN THE FULL THING OR NOT, THE FULL AMOUNT AT THE STATE LINE, DEPENDING ON THE DECISION AND THE AMOUNT SHOWN IN ANSWERING THE QUESTION WHETHER THERE WAS USABLE FLOW OR NOT THAT DAY.

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Appendix Item 25

Excerpt from R. vol. 109

May 14, 1992

(Cross-examination of Steve Vandiver)

[Pages 68-69]

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Q. LET'S TURN TO 1976, WHICH WOULD BE THE YEAR THAT INCLUDES THE BEGINNING PERIOD FOR THIS CURVE NUMBER 30. IF WE LOOK AT THE PAGE STARTING WITH 1976 AND CONTINUING BACK FOR THE SIX YEARS UNTIL 1982, IS THERE ANYTHING SIGNIFICANT ABOUT THE VALUES HERE THAT WOULD INDICATE TO YOU WHY THERE WASN'T A CHANGE IN THE RATING CURVE?

A. I THINK I HAVE TESTIFIED TO THAT. THERE WASN'T ANY MEASUREMENTS OR THERE WASN'T ANY FLOW ENOUGH TO MEASURE THAT WAS HIGH ENOUGH TO CHANGE THE END OF THE CURVE.

Q. OR ANY SECTION OF THE CURVE; IS THAT RIGHT? IT IS ESSENTIALLY ZERO ALL OF THE TIME?

A. THERE WAS A COUPLE OF LOW FLOW MEASUREMENTS, VERY LOW FLOW MEASUREMENTS, I THINK TWICE DURING THE YEAR, ONE IN MAY AND ONE IN SEPTEMBER, THAT WERE LESS THAN TWO-TENTHS OF A CFS.

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A-139

Appendix Item 26

Excerpt from R. vol. 115

May 22, 1992

(Direct Examination of Duane Helton)

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SPECIAL MASTER: WELL, BEFORE THE 1970'S, YOU JUST HAVE SAID THERE WAS REALLY NOT ANY LARGE IMPACT FROM WELLS IN KANSAS.

THE WITNESS: THAT IS CORRECT.

SPECIAL MASTER: SO DURING THE '70'S, WHERE YOU ARE CONCERNED, WE HAD THE SITUATION WHERE BOTH SIDES TENDED TO TAKE WHAT THEY COULD, AND ON A PROPORTIONAL BASIS, ACCORDING TO THEIR RIGHTS. BUT YOU ARE SAYING THAT DURING THAT PERIOD THAT THE WATER THAT KANSAS TOOK IMPACTED COLORADO IN AN ADVERSE WAY?

THE WITNESS: NO, SIR. I WILL NOT SAY THAT THE INCREASED THIRST IN KANSAS CAUSED INCREASED DEMANDS AGAINST CONSERVATION STORAGE DURING THE 1970'S. THE REASON I WON'T SAY THAT IS BECAUSE THE INFLOW INTO THE CONSERVATION STORAGE DURING MOST OF THOSE YEARS AND CERTAINLY DURING THE LATER YEARS WAS RELATIVELY SMALL. AND I BELIEVE THAT KANSAS WOULD HAVE CALLED FOR THE RELEASE OF ALL OF THAT WATER EVEN WITHOUT THE INCREASED THIRST.

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Appendix Item 27

Excerpt from R. vol. 116

May 26, 1992

(Cross-examination of Duane Helton)

.....

SPECIAL MASTER: I UNDERSTAND THAT. YOU KNOW, WE HAVE GOT A LOT OF EVIDENCE AND A LOT OF DOCUMENTARY EVIDENCE ON THE MANAGEMENT OF THE PROGRAM THAT COLORADO UNDERTOOK WITH RESPECT TO WELLS. BUT I THINK THE QUESTION WAS, IF YOU TRIED TO OPERATE THE WELLS STRICTLY IN ACCORDANCE WITH THE PRIORITY SYSTEM, THEY WOULDN'T OPERATE VERY OFTEN, WOULD THEY?

THE WITNESS: THAT IS CORRECT.

BY MR. DRAPER:

Q. ISN'T THAT TRUE ALSO OF PRE-COMPACT WELLS?

A. I THINK THAT IS TRUE ALSO.

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Appendix Item 28

Excerpts from R. vol. 127

September 23, 1992

(Direct Examination of Steve Larson)

[Pages 117-121]

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THE OTHER THING — AGAIN, WE ARE TRACKING TWO RUNS OF THE MODEL. WE ARE NOT GOING TO BE TAKING THE ACTUAL HISTORICAL STREAMFLOWS AT THE BASE LINE AND RUNNING A MODEL WITH AN INSTITUTIONAL CONDITION AND COMPARING THE HISTORICAL FLOWS TO THE CALCULATED FLOWS OF THE CONDITION. WE ARE NOT GOING TO BE DOING THAT. WE DON'T DO THAT. WE COMPARE TWO RUNS OF THE MODEL SO THAT WE TRY TO TAKE ADVANTAGE OF THE POTENTIAL FOR ERRORS TO IMPROVE OUR RESULT. AND I THINK WE HAVE SEEN AGAIN THROUGH THE SENSITIVITY STUDIES PROVIDED BY THE U.S. THERE IS — THAT FACT CAN BE SEEN.

SPECIAL MASTER: TELL ME A LITTLE BIT MORE OF YOUR VIEW OF THAT. THAT IS ANOTHER CRITICISM THAT IN FACT THOSE DON'T ALWAYS CANCEL THEMSELVES OUT.

THE WITNESS: ABSOLUTELY, THEY DON'T ALWAYS CANCEL OUT. ALL WE CAN SEE IS THAT THERE IS A LESS SENSITIVITY OF THE DEPLETIONS THAN THERE IS TO THE ACTUAL CALCULATIONS OF STATE LINE FLOWS. AND I THINK, AS I SAID EARLIER, THAT IS A VERY FAVORABLE CONDITION, BECAUSE THE POTENTIAL ERRORS IN THE PARAMETER WILL NOT AFFECT THE DEPLETIONS CALCULATION AS MUCH AS THEY WILL AFFECT STATE LINE FLOW CALCULATIONS.

I DON'T THINK IT IS REALLY POSSIBLE TO LOOK AT THE UNCERTAINTY IN THE ESTIMATES OF DEPLETIONS, WHICH IS REALLY WHAT WE ARE LOOKING AT ANYWAY. I THINK WE ARE GETTING A LITTLE AHEAD OF OUR PRESENTATION HERE. BUT I THINK I TALKED ABOUT THIS EARLIER, YOU CAN USE MONTE CARLO

ANALYSIS TO TRY TO DO THIS. THAT'S BY TRYING — BY LOOKING AT THE UNCERTAINTY IN INDIVIDUAL PARAMETERS, YOU CAN CALCULATE THE UNCERTAINTY IN THE OUTCOME OVER SOME RANGE. BUT AS I SAID EARLIER, I AM NOT SURE THAT REALLY HELPS YOU TOO MUCH FROM A STANDPOINT OF, WELL, IF WE HAD THAT UNCERTAINTY CALCULATED FOR THE COLORADO ANALYSIS AND FOR THE KANSAS ANALYSIS, THEN WE COULD KIND OF COMPARE THE TWO AND SEE WHAT THE RELATIVE AMOUNTS OF UNCERTAINTY WERE IN THE TWO ANALYSES.

I DON'T THINK THAT CAN BE DONE WITH THE COLORADO ANALYSIS JUST BECAUSE OF LOGISTICS. I DON'T THINK IT IS FEASIBLE TO DO IT. WE MIGHT BE ABLE TO DO IT WITH THE H-I-M BY DOING THOUSANDS AND THOUSANDS OF RUNS. I THINK THERE ARE A LOT OF ASSUMPTIONS YOU WOULD HAVE TO MAKE. YOU WOULD HAVE ESTIMATES ON TOP OF ESTIMATES.

HOWEVER, I DON'T THINK THAT CHANGES THE CONCLUSIONS THAT YOU REACH. THAT IS, LIKE, FOR EXAMPLE, SUPPOSE THAT WE ESTIMATED DEPLETIONS OF 50,000 ACRE FEET AND THE MARGIN OF THE UNCERTAINTY IS — LET'S SAY, THE STANDARD DEVIATION OF THE ESTIMATE IS PLUS OR MINUS 30,000, WELL, THAT DOESN'T CHANGE THE FACT THAT WAS THE BEST ESTIMATE THAT YOU CAN PROVIDE. ALL IT TELLS YOU IS THERE IS SOME PROBABILITY THAT THE TRUE VALUE, WHICH WE DON'T KNOW, COULD BE LOWER OR COULD BE HIGHER. AND THE NARROWER WE GET THAT UNCERTAINTY, THE LESS PROBABILITY THAT THE TRUE VALUE LIES FURTHER AWAY FROM THE ESTIMATE THAT WE HAVE. IT DOESN'T CHANGE THE ESTIMATE. THE ONLY WAY THAT I CAN SEE TO REDUCE THAT UNCERTAINTY IS YOU HAVE TO HAVE

MORE DATA, MORE DETAILED DATA, AND WE DON'T HAVE THAT.

SPECIAL MASTER: DO ENGINEERS HAVE BASIC JUDGMENTS ABOUT SOME OF THESE THINGS — APART FROM THE MONTE CARLO ANALYSIS — WHERE YOU LOOK AT THIS, AND YOU SAY MY NUMBER IS A HUNCH, THAT IS THE BEST ESTIMATE, THAT IS WHAT EVERYTHING SHOWS, BUT I COULD BE PRETTY SURE THAT IT IS BETWEEN 90 AND 100, SOMETHING LIKE THAT, THE REAL FACTS ARE SOMEWHERE IN THAT NEIGHBORHOOD?

THE WITNESS: I THINK WE CAN DO THAT FOR THE PREDICTION OF THE STREAMFLOWS. THE PROBLEM IS TRYING TO DO IT FOR THE PREDICTION OF DEPLETIONS, WHICH ARE REALLY THE ESSENCE OF THE ANALYSIS. AND THERE YOU DO HAVE THE CORRELATED ERROR PROBLEM YOU HAVE TO DEAL WITH. AND THE ONLY WAY THAT I KNOW OF GETTING AROUND THAT IS TO DO THE MONTE CARLO ANALYSIS. AND I DON'T KNOW THAT IT IS REALLY FEASIBLE. AND AGAIN, I AM NOT SURE THAT IT HELPS TO MAKE THE DECISION, BECAUSE THE ESTIMATED VALUE STILL IS YOUR BEST ESTIMATE. IT IS JUST MAYBE A HIGHER OR LOWER PROBABILITY THAT THE TRUE VALUE COULD BE DIFFERENT BY SOME AMOUNT OR ANOTHER.

SPECIAL MASTER: ALL RIGHT.

BY MR. DRAPER:

Q. NOW, WE HAVE TALKED ABOUT DIFFERENCES BETWEEN THE TWO MODELS. ARE THERE AREAS IN WHICH THE RESULTS OF THE KANSAS AND COLORADO ANALYSES AGREE?

A. WELL, I THINK IT IS CLEAR FROM BOTH OF THE ANALYSES THAT THERE ARE TRENDS IN STREAMFLOW DEPLETIONS AS A RESULT OF THE INCREASED PUMPING IN COLORADO. I THINK THAT

IS PRETTY UNAMBIGUOUS FROM BOTH OF THE ANALYSES.

SPECIAL MASTER: SAY THAT IN A LITTLE MORE DETAIL.

THE WITNESS: WELL, WE'LL GET TO AN EXHIBIT IN A MOMENT HERE.

SPECIAL MASTER: ALL RIGHT.

BY MR. DRAPER:

Q. I BELIEVE THAT EXHIBIT IS PLAINTIFF'S 695.
IS PLAINTIFF'S EXHIBIT 695 AN EXHIBIT YOU PREPARED?

A. YES, IT IS.

Q. WHAT DOES IT SHOW?

A. THIS SHOWS THE TOTAL ANNUAL DEPLETIONS — AND THIS WOULD BE DEPLETIONS AND ACCRETIONS — FOR THE TWO DIFFERENT ANALYSES. ONE IS THE COLORADO WATER BUDGET ANALYSIS AND THE OTHER IS THE ANALYSIS USING THE H-I-M BUT WITH THE COLORADO PUMPING ESTIMATES. AND THAT IS IN BLUE. THAT IS THE SAME SCENARIO 2 ON EXHIBIT 642.

SPECIAL MASTER: THE BLUE BARS INCLUDE THE COLORADO PUMPING ESTIMATES?

THE WITNESS: THE COLORADO PUMPING ESTIMATES USED IN THE H-I MODEL. NOW, REMEMBER, IT IS NOT —

SPECIAL MASTER: I UNDERSTAND THE DISTRIBUTION MAY NOT BE QUITE THE SAME.

THE WITNESS: EXACTLY. BUT AGAIN, IT IS AN ATTEMPT TO TRY TO PUT THINGS ON A MORE EVEN SCALE FOR COMPARISON PURPOSES.

AND THIS SHOWS THE ANNUAL VALUES FOR EACH YEAR FOR THE TWO ANALYSES, THE COLORADO WATER BUDGET ANALYSIS AND THE HYDROLOGIC-INSTITUTIONAL MODEL.

BY MR. DRAPER:

Q. IS IT POSSIBLE TO DRAW ANY CONCLUSIONS FROM THIS COMPARISON?

A. YES, I BELIEVE IT IS. I THINK YOU CAN LOOK AT THIS EXHIBIT AND SEE THE TREND OF INCREASE IN BOTH OF THE ANALYSES AS A RESULT OF HIGHER LEVELS OF PUMPING. AND IN PARTICULAR, YOU CAN SEE THAT IN THE PERIOD FROM THE MID TO LATE 1970'S THAT BOTH ANALYSES SHOW THAT TO BE THE PERIOD OF HIGHEST DEPLETIONS IN TERMS OF AT LEAST SUSTAINED LEVELS OF THE DEPLETIONS FOR A LONGER PERIOD OF TIME. I THINK IT IS UNAMBIGUOUS TO ME THAT THERE ARE THESE TRENDS IN THE '70'S — THE LATE '70'S, THE PERIOD OF HIGHEST DEPLETIONS. I THINK IT IS CLEAR FROM BOTH ANALYSES THAT THAT'S THE CONCLUSION THAT YOU WOULD DRAW.

.....

[Pages 123-24]

.....

Q. I'M NOW READY TO TURN TO ANOTHER SUBJECT, NAMELY, USABLE FLOW.

MR. HELTON HAS SUGGESTED THAT THE H.C.I. ANALYSIS IS PREFERABLE TO THE SPRONK ANALYSIS WITH RESPECT TO USABLE FLOWS.

DO YOU AGREE WITH THAT, MR. LARSON?

A. NO, I DO NOT.

Q. WHY NOT?

A. WELL, THERE ARE A COUPLE OF REASONS. FIRST OF ALL, THE STREAMFLOWS DURING THE LATE 1970'S AT THE STATE LINE WERE VERY LOW. AND THUS, I THINK DURING THIS PERIOD, IT IS CLEAR

THAT THE USABILITY OF STREAMFLOW IN KANSAS WOULD BE VERY HIGH DURING THAT PERIOD. THIS PERIOD OF HIGH USABILITY IS COINCIDENT WITH THE PERIOD OF HIGH DEPLETIONS THAT WE HAVE SEEN AS CALCULATED BY BOTH OF THE ANALYSES — THAT IS, BOTH THE COLORADO ANALYSIS AND OUR ANALYSIS USING THE HYDROLOGIC-INSTITUTIONAL MODEL — CLEARLY SHOW THE HIGHER DEPLETIONS ARE DURING THIS PERIOD IN THE 1970'S WHEN THE STREAMFLOW WAS VERY LOW. AND AS A RESULT OF THAT, THE H.C.I. METHOD WHICH RELIES ON AVERAGES WILL UNDERESTIMATE THE USABLE DEPLETIONS BECAUSE OF THAT — OF THE COINCIDENT NATURE OF THE HIGH DEPLETIONS AND THE HIGH USABILITY.

Q. AND HOW DOES THAT COMPARE TO THE H.C.I. METHOD?

A. THE H.C.I. METHOD RELIES ON AVERAGES. SO THAT DURING THAT PERIOD, BECAUSE IT IS USING AN AVERAGE CONDITION, WILL UNDERESTIMATE THE AMOUNT OF USABLE DEPLETIONS DURING THE PERIOD WHERE THE USABILITY WAS VERY HIGH.

SPECIAL MASTER: H.C.I. WAS THE ORIGINAL METHODOLOGY SUGGESTED BY MR. DURBIN?

THE WITNESS: YES.

.....

[Pages 132-33]

.....

SPECIAL MASTER: BOTH MR. HELTON AND MR. SCHROEDER HAVE TALKED ABOUT INCREASED

THIRST FOR RECHARGE AS A RESULT OF THE INCREASED PUMPING IN KANSAS.

DO YOU HAVE A COMMENT ON THAT?

THE WITNESS: WELL, I THINK EXHIBIT 698 TENDS TO GO TO THAT ISSUE FROM THE STANDPOINT -- AS I UNDERSTAND SOME OF THE CRITICISM — A LOT OF IT IS FOCUSED ON THE LATE PORTION OF THE STUDY PERIOD. AND THE POINT THAT I WANTED TO MAKE WITH EXHIBIT 698 WAS, SO FAR AS 1975, YOU COULD USE EITHER METHOD AND GET VERY COMPARABLE AMOUNTS, DEPLETIONS TO USABLE FLOWS.

THE SECOND POINT THAT I WANTED TO MAKE WAS THAT THE USABILITY IN THE LATE 1970'S, IN MY VIEW, WAS VERY HIGH, NO MATTER HOW YOU EXAMINED IT. THE STREAMFLOWS WERE VERY, VERY LOW. AND AS A CONSEQUENCE, USABILITY OF WATER IN KANSAS WOULD BE VERY, VERY HIGH. AND BECAUSE THAT IS COINCIDENT WITH THE PERIOD WITH BOTH ANALYSES — THAT IS THE ANALYSES PRESENTED BY COLORADO AND THE ANALYSES WE CONDUCTED USING THE HYDROLOGIC-INSTITUTIONAL MODEL — SHOW THE HIGHEST LEVEL OF DEPLETION. I THINK IT IS CLEAR THERE ARE GOING TO BE SIGNIFICANT DEPLETIONS DURING THAT PERIOD. AND BECAUSE THE AVERAGING METHOD OF H.C.I. USES AN AVERAGE DURING THAT PERIOD, THAT EXPLAINS WHY WE GET A DIFFERENCE WHEN WE USE THE SPRONK METHOD. AND SO I THINK MY RESPONSE TO THAT WOULD BE THAT THE USABILITY DURING THAT PERIOD WAS VERY HIGH IRRESPECTIVE OF THOSE KINDS OF CONCERNS.

.....

Appendix Item 29

Excerpt from R. vol. 128

September 24, 1992

(Cross-examination of Steve Larson)

.....

SPECIAL MASTER: IS THAT CORRECT, YOU HAVE SUCH A GENERAL SENSE IN MIND?

THE WITNESS: YES, I HAVE A GENERAL SENSE.

SPECIAL MASTER: THEN I THINK SHE WANTS TO KNOW WHAT IT IS.

THE WITNESS: I THINK YOU CAN SEE BY LOOKING AT THOSE RELATIVE SENSITIVITIES THAT THE SENSITIVITY OF DEPLETIONS TO PARAMETER CHANGES IS SIGNIFICANTLY LESS THAN THE SENSITIVITY OF STATE LINE FLOWS. SO MY SENSE WOULD BE THAT THE UNCERTAINTY IN DEPLETIONS WOULD BE MUCH LOWER THAN THE UNCERTAINTY IN THE STATE LINE FLOWS.

BY MS. WEISS:

Q. WELL, DID YOU THINK DEPLETIONS ARE CALCULATED WITHIN A RANGE OF PLUS OR MINUS 50 PERCENT?

A. I HAVEN'T QUANTIFIED IT.

Q. I UNDERSTAND.

A. BUT I THINK IT IS LESS THAN THAT.

Q. LESS THAN 50 PERCENT?

A. YES.

Q. DO YOU THINK IT IS LESS THAN 20 PERCENT?

A. I'M NOT SURE.

Q. WHAT IS YOUR REACTION TO 10 PERCENT?

A. I'M NOT SURE THERE, EITHER.

.....

Appendix Item 30

Questions Presented, New Mexico's Brief in Support of Exceptions (Dec. 2, 1982), *Texas v. New Mexico*, 462 U.S. 554 (1983) (No. 65, Original) (excerpt)

A-163

IN THE

Supreme Court of the United States

OCTOBER TERM, 1982

No. 65, Original

STATE OF TEXAS,

Plaintiff

v.

STATE OF NEW MEXICO,

Defendant

UNITED STATES OF AMERICA,

Intervenor

BRIEF IN SUPPORT OF EXCEPTIONS

QUESTIONS PRESENTED

---

1. Whether the Court may rewrite the voting provisions of Article V of the Pecos River Compact to provide for a tie-breaker, thus diluting the voting strength of the party states, eliminating the Compact's requirement of unanimity and foreclosing the right of each state to veto Commission action.

2. Whether the Court should review findings of fact the Commission made in 1962 where Texas, the plaintiff, disputes their validity and the validity of the Review of Basic Data on which they are based.

(18)

No. 105, Original

Supreme Court, U.S.
FILED
NOV 17 1994
OFFICE OF THE CLERK

In The

Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

UNITED STATES OF AMERICA,

Defendant-Intervenor.

COLORADO'S EXCEPTIONS TO THE REPORT OF THE SPECIAL MASTER AND BRIEF IN SUPPORT THEREOF

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No. 105, Original

In The

Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

UNITED STATES OF AMERICA,

Defendant-Intervenor.

EXCEPTIONS TO THE REPORT OF THE SPECIAL MASTER

The State of Colorado respectfully excepts to the Report of Special Master Arthur L. Littleworth dated July, 1994, as follows:

1. Colorado excepts to the Master's findings that Kansas was not guilty of inexcusable delay in making its well claim and that Colorado was not prejudiced by Kansas' failure to press its claim earlier.

2. Colorado excepts to the Master's ruling that, under Article IV-D of the Arkansas River Compact, pre-compact wells in Colorado are limited to pumping the highest amount pumped in the years during which the Compact was

negotiated and the Master's finding that the highest amount of such pumping was 15,000 acre-feet per year.

3. Colorado excepts to the Master's ruling that increases in usable Stateline flows resulting from the Operating Plan for John Martin Reservoir adopted by the Arkansas River Compact Administration in 1980 were "separately bargained for" and, therefore, should not offset depletions caused by post-compact well pumping in Colorado.

4. Colorado excepts to the Master's ruling that Kansas need only meet the "preponderance of the evidence" test applicable to ordinary civil litigation to prove a breach of Article IV-D of the Arkansas River Compact.

Respectfully submitted,

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No. 105, Original

In The

Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

UNITED STATES OF AMERICA,

Defendant-Intervenor.

BRIEF IN SUPPORT OF COLORADO'S EXCEPTIONS

QUESTIONS PRESENTED

1. Whether the defense of laches is applicable against a state in a controversy between states in this Court.

2. Whether Kansas inexcusably delayed in bringing a claim for damages against Colorado for breach of the Arkansas River Compact from post-compact well pumping in Colorado and whether Colorado was prejudiced by Kansas' delay.

3. Whether Article IV-D of the Arkansas River Compact limits pre-compact wells in Colorado to pumping the highest amount pumped during the years when the Compact was negotiated; and, if so, whether the Special Master was correct in determining that the highest amount pumped during those years was 15,000 acre-feet per year.

4. Whether increases in usable Stateline flows resulting from the Operating Plan for John Martin Reservoir adopted by the Arkansas River Compact Administration in 1980 should offset depletions caused by post-compact well pumping in Colorado.

5. Whether the preponderance of the evidence standard applies in a controversy between states involving an alleged breach of an interstate compact.

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[1] Record corrected by Order to Correct Record Re Defendant's Exhibits, Report-App. 119, ¶1 (Jan. 5, 1994).

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REPORT OF THE SPECIAL MASTER

Colorado submits this brief in support of its exceptions to the July, 1994 Report of Arthur L. Littleworth, Special Master (hereinafter the "Report"). The Report sets forth the Master's findings and recommendations on the liability phase of the case. Report at 11. Remedy issues, including damages, were severed pending a determination on liability. *Id.*

JURISDICTION

The original jurisdiction of the Court was invoked by the State of Kansas under Article III, Section 2, Clause 2 of the United States Constitution and 28 U.S.C. §1251(a)(1).

ARKANSAS RIVER COMPACT

The Arkansas River Compact is an interstate compact between Colorado and Kansas. The Compact was signed by Commissioners for Colorado and Kansas on December 14, 1948. Jt. Exh. 1.[1] The Compact became effective on May 31, 1949, after it was ratified by the legislature of each state and consented to by Congress. Arkansas River Compact, Art. IX-A; Act of May 31, 1949, Ch. 155, 63 Stat.

[1] Exhibits and the reporter's transcript are cited in this Brief in the same way the Master cited them in his Report. Report at xvi, 12-13.

145 (1949) (Jt. Exh. 2).[2] The provisions of the Arkansas River Compact are set forth in Exhibit 1 of the Appendix to the Report. Report-App. at 1-17.

STATEMENT OF THE CASE

In March 1986, Kansas was granted leave to file this action against Colorado. 475 U.S. 1069 (1986). In its complaint, Kansas alleged that Colorado had violated the Arkansas River Compact. The Special Master's Report describes the major issues and claims of the parties. Report at 58-64.

In his Report, the Master recommends that the Court find that post-compact well pumping in Colorado has violated Article IV-D of the Arkansas River Compact. Report at 336. He also recommends that the Court find that Kansas failed to prove its claim that operation of the so-called Winter Water Storage Program has violated the Compact. *Id.* Finally, he recommends that the Court confirm his earlier decisions to dismiss all other claims and counterclaims. *Id.* at 336-37.

[2] The acts of the state legislatures ratifying the Compact are printed in hearings held by Congress on the Compact. *Arkansas River Compact: Hearing on S. 1448 Before the Senate Comm. on Interior and Insular Affairs*, 81st Cong., 1st Sess. 8-9, 18-19 (1949) [hereinafter cited as *Senate Hearing*] (Jt. Exh. 15); *Arkansas River Compact: Hearing on H.R. 4151 Before the Subcomm. on Irrigation and Reclamation of the House Comm. on Public Lands*, 81st Cong., 1st Sess. 10-11, 31 (1949) [hereinafter cited as *House Hearing*] (Jt. Exh. 16).

If the Court affirms his Report, the Master recommends that the case be remanded for further evidence to quantify depletions to usable Stateline flows and for completion of the remedy phase. Report at 290, 337.

One ruling in the Report deserves special notice. Although the Master found that Kansas knew or should have known of the effects of post-compact well pumping in Colorado by 1968 and that Kansas did not complain about such pumping until 1984 at the earliest, he rejected Colorado's defense of laches. Report at 153-70. This ruling, if affirmed by the Court, would allow Kansas to claim damages for depletions to usable Stateline flows dating back to 1950. *Id.* at 164-68.

A. DESCRIPTION OF THE ARKANSAS RIVER BASIN

The Arkansas River originates on the eastern slope of the Rocky Mountains, upstream of the old mining town of Leadville, Colorado. Report at 35. The river begins as a mountain torrent until, near Canon City, it emerges from the mountains into a foothills region. *Kansas v. Colorado*, 206 U.S. 46, 105 (1907). The river then flows through a narrow valley until it reaches the City of Pueblo, where the river leaves the foothills and meanders across the High Plains into Kansas.[3]

[3] For an excellent description of the Arkansas River Basin in Colorado and Kansas, see U.S. Dept. of Interior, Bureau of Reclamation, *Report on the Upper Arkansas River Basin, Colorado-Kansas* 5-19 (1969) (Jt. Exh. 105).

The Arkansas River Valley between Pueblo, Colorado, and Garden City, Kansas, is what westerners call semi-arid, which means that crops generally cannot be grown without irrigation. Jt. Exh. 105 at 7. Rainfall averages less than 12 inches per year at Pueblo, which gradually increases to an average of slightly more than 18 inches per year at Garden City. *Id.* at 7; Jt. Exh. 140 at 15.

The Arkansas River Valley is a fertile agricultural area, but the water supply in the Arkansas River is not adequate to irrigate the lands along the river and is subject to wide fluctuations not only from year to year, but also from season to season and day to day. Jt. Exh. 105 at 13, 34, 69; *Colorado v. Kansas*, 320 U.S. 383, 396 (1943). Runoff from mountainous areas above Canon City, which is derived primarily from snowmelt, is more uniform from year to year and fluctuates less widely than runoff from foothills and plains drainage areas. Jt. Exh. 5 at 10. As a result, the mountain runoff is more usable and is diverted for irrigation largely in Colorado. *Id.*[4]

More than 60 percent of the average annual mainstem runoff in Colorado occurs during April, May, and June. Jt. Exh. 105 at 60. Lands under most canals experience shortages of surface water after June, when the

[4] The flow of the river at Canon City (excluding transmountain imports) averaged 499,200 acre-feet per year over the period 1908-84, varying from 217,200 acre-feet in 1940 to 896,600 acre-feet in 1957. Jt. Exh. 29, Table 6D2. In contrast, the flow of the Purgatoire River, the largest tributary of the Arkansas River, measured near Las Animas just upstream from where it joins the Arkansas River, averaged 61,659 acre-feet per year for the period 1950-85, ranging from 4,571 acre-feet in 1975 to 271,256 acre-feet in 1965. Colo. Exh. 836, Col.(2).

snowmelt is generally gone. Jt. Exh. 92 at i. Shortages in Colorado are partially alleviated by reservoir releases, transmountain imports, and ground water pumping. Jt. Exh. 105 at 60.

Tributary inflow below Pueblo provides a portion of the water supply to ditches on the Arkansas River. Jt. Exh. 105 at 58. However, these streams are mostly intermittent and their flow is derived primarily from intense summer rainstorms, so that they do not provide a dependable supply to ditches on the Arkansas River. Jt. Exh. 92 at 5. Most of the flood flow above John Martin Reservoir is now captured by reservoirs in Colorado, but tributaries below John Martin are largely unregulated. Jt. Exh. 105 at 43.[5]

Prior to the construction of John Martin Reservoir, Stateline flows averaged 280,800 acre-feet per year over

[5] The John Martin Reservoir project (which was originally known as the Caddoa Reservoir Project) was authorized for construction by the U.S. Army Corps of Engineers in 1936 to provide flood control and water conservation in Colorado and Kansas. Arkansas River Compact, Art. III-D. Potential usefulness of the reservoir in facilitating a settlement of the long-standing interstate controversy between Colorado and Kansas was also a consideration in authorization of the project. H. Kramer, *Report to the Congress of the United States on the Proposed Arkansas River Compact Between Colorado and Kansas, reprinted in Senate Hearing, supra* note 2, at 32-33 (1949) [hereinafter cited as "Kramer Report"] (Jt. Exh. 15). General Kramer's report to Congress, together with a General Map of the Arkansas River Basin, is also reprinted in the *House Hearing, supra* note 2, at 34-41 (Jt. Exh. 16). Water stored in the conservation pool of John Martin Reservoir is apportioned between Colorado and Kansas in the Arkansas River Compact. Arkansas River Compact, Art. II-B, V.

the period 1908-1942, varying from 30,900 acre-feet in 1940 to 1,342,400 acre-feet in 1942. Jt. Exh. 5 at 15, Summary Table C. It was expected that the operation of John Martin in accordance with the provisions of the Arkansas River Compact would reduce total Stateline flows by storing flood flows and winter flows which had previously been unused. Report at 54, 144. After the Compact became effective, Stateline flows averaged 144,051 acre-feet per year for the period 1950-85. *Id.* at 53. Even after the Compact became effective, however, it was expected that there would still be substantial amounts of water passing Garden City unused each year which would be available for future development in the basin.[6]

B. HISTORY OF IRRIGATION AND WELL DEVELOPMENT IN THE ARKANSAS RIVER BASIN

Colorado

Irrigation in the Arkansas River Basin in Colorado began in 1859 shortly after the Pikes Peak gold rush, although large-scale irrigation did not begin until 1874, near Rocky Ford. Jt. Exh. 105 at 8.

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[6] Shortly after the Compact became effective, the U.S. Bureau of Reclamation estimated that there was an average of about 48,000 acre-feet per year available for storage in excess of the requirements of water users in Kansas. Colo. Exh. 112 at 3-4, 6. This estimate was based on water which could be diverted at rates of 200 cubic feet per second ("cfs") or less. *Id.* at 6, note b. If flood flows in excess of 200 cfs had been considered, there was more unused water passing Garden City.

The major irrigation systems in the Arkansas River Valley in Colorado were developed primarily during the 1880s. Jt. Exh. 105 at 89. By 1910, a complex system of private irrigation ditches and reservoirs had been developed in Colorado to irrigate approximately 325,000 acres between Pueblo and the Stateline. *Id.* at 8, 58; Report at 37. The river supply was inadequate to irrigate this acreage, and by 1935 seven projects had been constructed to import water into the Arkansas River Basin in Colorado, mostly from the Colorado River Basin (commonly referred to as "transmountain imports"). Jt. Exh. 105 at 8, 83-85. At the time the Compact was negotiated, transmountain imports were averaging approximately 43,000 acre-feet per year. Report at 49. With the completion of the Fryingpan-Arkansas Project, a $432 million water project authorized by Congress in 1962,[7] the United States Bureau of Reclamation estimated that total diversions from the Colorado River Basin into the Arkansas River Basin would average 196,000 acre-feet annually, 38 percent of the average annual flow of the Arkansas River at Pueblo. Jt. Exh. 105 at 2.[8] These transmountain imports

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[7] Act of Aug. 16, 1962, Pub.L. No. 87-590, 76 Stat. 389 (1962) (Jt. Exh. 168); as amended by the Reclamation Development Act of 1974, Pub.L. No. 93-493, Title XI, §1101, 88 Stat. 1497-98 (increasing the appropriation for the Fryingpan-Arkansas Project to $432,000,000) (Jt. Exh. 169). For a description of the Fryingpan-Arkansas Project, see Jt. Exh. 105 at 102-07.

[8] In 1962, the average annual flow of the Arkansas River at Pueblo was about 514,000 acre-feet per year, including transmountain imports. Jt. Exh. 105 at 58. The mainstem flow at Pueblo cited by the Master, Report at 51, is a "composite flow" which was developed by the Kansas experts for use in the Kansas hydrologic-institutional model and includes inflow

are important because the Arkansas River Compact excludes imported water from the apportionment to Kansas. Report at 257; Arkansas River Compact, Art. III-B, IV-A.

Ground water has been used for irrigation for many years in the Arkansas River Valley in Colorado, primarily to supplement surface supplies. Jt. Exh. 105 at 39. According to a careful study made by Colorado, Report at 204, there are 717 large-capacity (100 gallons per minute or greater) irrigation wells in Colorado along the mainstem of the river with appropriation dates earlier than 1950. Colo. Exh. 165*, Table A.1 (Total number of wells, 1949). By 1985, there were about 2,062 large-capacity irrigation wells along the mainstem in Colorado. *Id.*[9] Most of the new wells constructed in Colorado after the Compact became effective were constructed prior to 1965, when the Colorado legislature enacted legislation to authorize the State Engineer to deny well permits on the basis of injury to other water rights. Report at 109-10.

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from Fountain Creek and diversions by the Bessemer Ditch, which actually diverts above Pueblo. Colo. Exh. 831; RT Vol. 113 at 121-24 (Helton). Not all of the water imported into the Arkansas River Basin is used in the Arkansas River Valley below Pueblo. Report at 48-49. Average deliveries of transmountain water below Pueblo have averaged approximately 120,000 acre-feet in recent years. *Id.* at 49.

[9] The Master states that Colorado's total for the number of wells is 2,057. Report at 203, citing Colo. Exh. 851. That exhibit was prepared to compare the number of wells in the Kansas well database and the Colorado well database. For purposes of that comparison, five wells under the Highland Ditch on the lower Purgatoire River were excluded in the Colorado total shown on Colo. Exh. 851.

The amount of ground water pumping in Colorado was a subject of considerable dispute in this case; but there was no dispute that pumping in Colorado had increased substantially after the Compact became effective. Report at 115. According to Colorado's estimates, total pumping along the river from Pueblo to the State-line increased from 41,458 acre-feet in 1950 to a maximum of 285,887 acre-feet in 1976. Colo. Exh. 852. According to Kansas' estimates, pumping increased from 31,201 acre-feet in 1950 to a maximum of 314,749 acre-feet in 1976. *Id.* The amount of pre-compact pumping was subject to much greater dispute, as will be discussed later in this brief.

Kansas

In Kansas, irrigation from the Arkansas River began in 1879. Jt. Exh. 105 at 38; *House Hearing*, *supra* note 2, at 31 (Statement by George S. Knapp).[10] Irrigated acreage

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[10] The Master, relying on a report prepared by an historian called by Kansas states: "The settlement of Kansas, which was admitted to the Union in 1861, commenced before that in Colorado. It was not until 1876 that Colorado became a state. By the 1870s, the transformation of prairie grasslands in Kansas into irrigated farms and small towns was well underway." Report at 1-2. This gives an erroneous and distorted picture of development in the Arkansas River Basin in Colorado and Kansas upstream from Garden City, Kansas. Settlement and irrigation began first in the Colorado portion of the basin following the Pikes Peak gold rush in 1858. *See Kansas v. Colorado*, 206 U.S. at 107-08 (tables of census data for population and number of acres cultivated in Colorado counties). Significant settlement in Hamilton, Kearny, and Finney Counties in Kansas did not begin until the 1880s. *Id.* at 110-12 (tables of census data for population and number of acres cultivated in Kansas counties).

grew steadily from approximately 15,000 acres in 1895, *Colorado v. Kansas*, 320 U.S. at 399, to about 66,000 acres in 1949. Report at 221. The ditches in Kansas under the Arkansas River Compact are located in Hamilton, Kearny, and Finney Counties and divert from the Arkansas River upstream from Garden City, Kansas. Jt. Exh. 105 at 111-14.[11]

The use of ground water for irrigation in Kansas dates back to about 1890 when windmill-powered pumps were first used. Jt. Exh. 105 at 40. By the late 1930s, many farmers in Kansas supplemented diversions from the river with irrigation wells and some used wells exclusively. *Colorado v. Kansas*, 320 U.S. at 399. In 1962, the Bureau of Reclamation surveyed the irrigation practices under the eight ditches in Kansas and found that the land irrigated in the area had increased to an estimated 75,800 acres. Jt. Exh. 105 at 130. Of this acreage, 71 percent (53,839 acres) used both surface and ground water, 17 percent (12,846 acres) used ground water only, and 12 percent (9,110 acres) used surface water only. *Id.* at 112, 130. In 1988, the Kansas Division of Water Resources did a study of acres irrigated in the ditch service areas and along the river and found a total of 98,274 acres irrigated by surface and ground water. RT Vol. 31 at 72 (Frost).

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[11] The reason there are no ditches below Garden City is due to the physical conditions peculiar to the Arkansas River Basin in Kansas. Kramer Report, *supra* note 5, at 34 (Jt. Exh. 15); *see also House Hearing*, *supra* note 2, at 46-48 (Statements of General Hans Kramer, federal representative to the Arkansas River Compact Commission, and George S. Knapp, Chairman of the Kansas Commissioners) (describing the peculiar physical characteristics of the Arkansas River).

Outside the ditch service areas there was a considerable expansion of irrigated acreage, particularly in the late 1960s and 1970s when center-pivot irrigation sprinkler systems were developed which could irrigate lands which had not been leveled. Report at 221; Jt. Exh. 140 at 13. The U.S. Geological Survey (USGS) estimated that in 1980 there were approximately 351,000 acres in Hamilton, Kearny, and Finney Counties irrigated by surface water and ground water hydrologically connected to the Arkansas River,[12] a more than five-fold increase since the Compact was signed.

Ground water pumping in Kansas increased as irrigated acreage increased.[13] In 1939, the USGS estimated that about 50,000 acre-feet had been pumped for irrigation

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[12] Jt. Exh. 139 at 15 (31,000 acres in the phase I study area); Jt. Exh. 140 at 11 (320,000 acres in the phase II study area). The phase I study area was from the Stateline to the Bear Creek Fault zone. Jt. Exh. 139 at 3. It is shown on Figure 1 of Jt. Exh. 139 at 2. The phase II study area, which included portions of Kearny and Finney Counties, is shown in Figure 1 of Jt. Exh. 140 at 2.

[13] Census figures for Hamilton, Kearny, and Finney Counties for 1929, 1939, 1949, 1959, and 1964 are tabulated by the Bureau of Reclamation in Jt. Exh. 105 at 74. In 1939, irrigated acreage in the three counties was about 56,000 acres. By 1964, it had increased to about 160,000 acres. *Id.* The Bureau of Reclamation noted that the rapid expansion of irrigation in southwestern Kansas had been made possible primarily through the use of ground water, "but not without some serious local problems." *Id.* at 134. The Bureau of Reclamation warned that water levels were declining, that ground water "mining" was occurring in the Garden City area, and that as overdrafts continued, the yield of individual wells would decrease. *Id.* at 40.

in Hamilton, Kearny, and Finney Counties.[14] In 1979 and 1980, the USGS estimated that about 803,000 acre-feet had been pumped in the three counties from wells which were hydrologically connected to the Arkansas River.[15]

Much of the increased pumping in Kansas is from what is commonly referred to as the "Ogallala Aquifer," which underlies the Arkansas River and its alluvium east of the Bear Creek fault zone. Report at 223; *see* Jt. Exh. 138 at 25-28; Jt. Exh. 139 at 2, Fig. 1. The Master states that there is a "major confining zone" which separates the alluvium from the Ogallala Aquifer and that the upper aquifer and the Ogallala Aquifer "act independently." Report at 222. This implies a much greater degree of separation than exists. The USGS did an extensive study of the interrelationship of aquifers in the area in the early 1980s. Jt. Exh. 140. The USGS concluded that as ground water development intensified, "water from the valley and upper aquifer leaked downward through the confining zone to the lower aquifer." Jt. Exh. 140 at 22. The

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[14] Kan. Exh. 447 at 118 (27,100 acre-feet in Finney County); Kan. Exh. 448 at 97-98 (23,000 acre-feet in Hamilton and Kearny Counties).

[15] Jt. Exh. 139 at 8 (65,000 acre-feet pumped in 1979); Jt. Exh. 140 at 11 (738,000 acre-feet pumped in 1980). There were no complete estimates for ground water withdrawals in Hamilton, Kearny, and Finney Counties for the intervening years, although a report prepared by the Kansas Water Resources Board showed a steady increase in irrigated acreage and acre-feet applied in the three counties from 1950 to 1966. Jt. Exh. 86 at 4-5 and county data for Hamilton, Kearny, and Finney Counties. Estimates of ground water withdrawals in Finney County by the USGS also showed a steady increase between 1945 and 1963. Jt. Exh. 138 at 70.

USGS also concluded that "[t]he result of the increased downward leakage of water from the valley and upper aquifers to the lower aquifer has been the water-table decline observed after 1973 in the valley aquifer near Deerfield; . . . " *Id.* at 23. Further, the USGS concluded that "[d]ownward leakage of water from the upper aquifer to the lower aquifer has led to the dewatering of the upper aquifer on the high plains." *Id.* Thus, while there is some separation between the alluvium and the Ogallala Aquifer, the confining zone is not a barrier to movement of ground water and increased pumping from the Ogallala Aquifer in Kansas has led to water level declines in the alluvium and dewatering of the upper aquifer. *Id.* It has also led to increased transit losses between the State-line and the headgates of Kansas ditches. Report at 226.

C. *COLORADO V. KANSAS*

The opinion in *Colorado v. Kansas*, 320 U.S. 383 (1943), sets the backdrop for this case. In *Colorado v. Kansas* this Court rejected a Master's finding that Colorado's use of the waters of the Arkansas River had materially increased, as well as his recommendation for an allocation of the flows of the river between Colorado and Kansas. The Court did so on the basis that Kansas had not proven that Colorado's use had materially increased and that the increase had worked a serious detriment to the substantial interests of Kansas. *Id.* at 400. Among the factors that persuaded the Court that Kansas had not met its burden of proof was the fact that Kansas had taken no

action while improvements based on irrigation went forward in Colorado for twenty-one years. *Id.* at 394. The Court said:

> These facts might well preclude the award of the relief Kansas asks. But in any event, they gravely add to the burden she would otherwise bear, and must be weighed in estimating the equities of the case.

320 U.S. at 394, *citing Washington v. Oregon*, 297 U.S. 517, 526 (1936). The Court also noted that despite the claim that Colorado's use had materially increased, there had been a steady increase in acreage irrigated in Kansas, from 15,000 acres in 1895 to 56,000 acres in 1939. 320 U.S. at 399.

The 1943 opinion made no mention of John Martin Reservoir, which had been authorized by Congress in 1936. Report at 45. At the time of the Court's decision, the reservoir was under construction on the mainstem of the Arkansas River in Colorado, approximately 58 miles upstream from the Stateline. *Id.* Water stored in the reservoir was allocated between the states pursuant to a stipulation signed in 1933; but, the stipulation was only effective until this Court's decision in *Colorado v. Kansas*. *Id.* at 78-79. Although the Court did not address John Martin Reservoir, it encouraged the states to settle their disputes by agreement, 320 U.S. at 392, which they did.

D. THE ARKANSAS RIVER COMPACT

In December 1948, after three years of negotiations, Commissioners for Colorado and Kansas signed the Arkansas River Compact. The Compact became effective

on May 31, 1949, after it had been ratified by the legislature of each state and consented to by Congress.[16]

The Compact does not apportion the waters of the Arkansas River between Colorado and Kansas based on beneficial consumptive use or a Stateline delivery obligation, as in some other interstate water compacts, but instead gives both states the right to make demands for releases from John Martin Reservoir at the times and at the rates specified in the Compact. Arkansas River Compact, Art. V. The Compact did not prohibit future development of the waters of the Arkansas River, "[p]rovided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction." *Id.*, Art. IV-D. General Hans T. Kramer, the federal representative to the Commission which negotiated the Compact and who served as its chairman, Report at 91, 92, explained the history of the negotiations in a letter to the U.S. Army Corps of Engineers in which he described the philosophy of the Compact as "Live and Let Live." Colo. Exh. 57. That philosophy accurately describes the attitude of both states toward post-compact well development for many

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[16] For an excellent summary of the provisions of the Arkansas River Compact, see J. Breitenstein, *The Law of the Arkansas River* at 10-12 (paper presented to the Arkansas-White-Red Basins Inter-Agency Committee meeting, July 18, 1951) (Colo. Exh. 650). Jean Breitenstein was a recognized expert in western water law and was later appointed as Special Master in *Texas v. New Mexico*. *See Texas v. New Mexico*, 482 U.S. 124, 127 (1987).

years. As long as well development was occurring in both states, there were no complaints about such development.[17]

For 30 years after the Compact became effective there were relatively few disputes over the use of waters of the Arkansas River; however, in 1980, Kansas complained about storage in Trinidad Reservoir, a federal reservoir on the Purgatoire River, Report-App. at 56, and thereafter made complaints about the Winter Water Storage Program in Colorado. Report at 312. In late 1983, Kansas hired an engineering firm to investigate the reasons for declining Stateline flows; and, in March 1985, Kansas

[17] The Master concluded that General Kramer's remarks "relate only to the conservation pool in John Martin and the ability of both states to draw upon it according to need." Report at 106. This interpretation of General Kramer's remarks is not correct. In 1954, General Kramer, who was appointed as the first federal representative to the Arkansas River Compact Administration, discussed the intent of the framers of Article IV-D of the Compact. Minutes of Arkansas River Compact Administration Annual Meeting (Dec. 14, 1954) at 11-13 (Jt. Exh. 19). He stated that "[a]s the author of portions of the Compact and as Chairman of the negotiating commission, he felt that he was in a position to know the meaning of the wording as adopted." *Id.* at 11. After quoting from portions of his report to Congress and the record of the Compact Commission, General Kramer stated that "the basic motivating principle in formulation of the Compact was, 'Live and Let Live.' " *Id.* at 13. In determining whether a depletion from a proposed federal project on the Purgatoire River was material, General Kramer stressed that the principle of "Live and Let Live" should be adhered to. *Id.* Thus, General Kramer believed that the "Live and Let Live" philosophy applied not only to the ability of both states to draw on the conservation pool, but also to future development in the basin.

requested an investigation by the Arkansas River Compact Administration[18] of alleged Compact violations caused by the operation of Trinidad Reservoir, the operation of the Winter Water Storage Program, and, for the first time, post-compact well pumping in Colorado. *Id.* at 153.

E. THE CURRENT DISPUTE

In December 1985, Kansas filed a motion for leave to file a complaint against Colorado, together with a complaint alleging that Colorado had rejected its requests to investigate the alleged Compact violations. Report at 15.

In March 1986, the Court granted Kansas' motion and allowed Colorado 60 days to file an answer. 475 U.S. 1069 (1986). The Master has provided a detailed summary of the procedural history of the case in his Report, including the breakdown suffered by Kansas' chief technical expert witness, Timothy J. Durbin, during cross-examination after numerous errors were brought out in various Kansas exhibits and the Kansas hydrological-institutional model ("H-I Model"), which he had developed to support Kansas' claims. Report at 15-34. The Master has also

[18] The Arkansas River Compact Administration is an interstate agency created by the Compact. Arkansas River Compact, Art. VIII-A. The membership of the Compact Administration consists of three representatives of each state and a federal representative who acts as chairman but has no vote. *Id.*, Art. VIII-C. The Compact provides that violations of any of the provisions of the Compact or other actions prejudicial thereto which come to the attention of the Compact Administration "shall be promptly investigated by it." *Id.*, Art. VIII-H.

described the substantial delay and the changes to Kansas' case resulting from Mr. Durbin's hospitalization and replacement by other experts.[19] *Id.* at 29-31, 241-48. We will not repeat that full history here, except to note that the numerous errors and poor assumptions in the H-I Model did affect the credibility of Kansas' case. *Id.* at 236-37, 315-16, 335. As the Master states:

> The major changes in Kansas' position and evidence cannot be ignored. For some five years the Kansas experts worked to accumulate the necessary data and to develop the H-I model in order to support the state's claims. Yet after Colorado's cross-examination during trial uncovered numerous errors and shortcomings in the Kansas evidence, and after the trial recess caused by Durbin's hospitalization, Kansas' replacement experts testified to substantially different conclusions than those resulting from the original H-I model. Brent E. Spronk, one of Kansas' replacement experts, testified openly that the results of the original H-I model were not reliable.

Report at 236-37 (footnotes omitted).

After the Kansas replacement experts corrected errors and addressed many of the poor assumptions in H-I Model, and in the process added some 900 lines of new code to the program for the model, the model was

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[19] The Master, over Colorado's objection, granted Kansas' motion for a lengthy continuance to replace Mr. Durbin in part because of "the important sovereign interests that are involved in this case, . . . " Report-App. at 91-92.

unable to predict diversions and Stateline flows accurately, even on a long-term basis. Report at 245-46. The model over-predicted diversions by ditches in Colorado and under-predicted Stateline flows. *Id.* This was due, in part, to the fact that the replacement experts did not attempt to correct all of the shortcomings in the modeling process which had been identified by Colorado's experts. Report at 238-39.[20]

To improve the model's ability to predict diversions and Stateline flows, the Kansas replacement experts resorted to a series of Rube Goldberg-like steps to calibrate the model. First, they reduced the known, measured capacity of many of the Colorado canals in the model to limit the amounts they could divert. Report at 246. Second, they added "diversion reduction factors" to reduce the amounts that could be diverted under some of the larger water rights in Colorado. *Id.* Third, they routed the water which these rights were not permitted to divert because of the "diversion reduction factors" directly to John Martin Reservoir or the Stateline. *Id.* at 246-47.

Colorado's experts were highly critical of the way in which the model had been calibrated by the Kansas

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[20] The H-I Model is a computer program which was developed to predict diversions and streamflows in Colorado from Pueblo to the Stateline. Report at 230-34. In addition to diversions and streamflows, many factors are considered in the model, including reservoir operations, tributary inflows, crop consumption, non-crop consumption, and irrigation pumping. *Id.* at 233-34. As the Master comments, "[i]t represents an enormously difficult task, the complexities of which may not have been fully appreciated when Durbin began to develop the basic structure of the model." *Id.* at 230 (footnote omitted).

replacement experts, Report at 247, although one of Colorado's principal experts did concede, after the errors and poor assumptions had been corrected, that the H-I Model did provide a rough idea, on a long-term basis, of the impacts of well pumping in Colorado. *Id.* at 253. Colorado and the United States' experts did not agree, however, that the model was reliable to evaluate the effects of the Winter Water Storage Program, *id.* at 322-27, and the Master has recommended that the Court find that Kansas failed to prove its claim that operation of the Program has violated the Compact. *Id.* at 335.

To put the errors and poor assumptions in the original H-I Model in perspective, it is helpful to compare the results of the model before and after it was revised. In the original version presented by Mr. Durbin, the model calculated total depletions of Stateline flows from post-compact well pumping in Colorado (before any offset for transmountain return flows) of 1,581,000 acre-feet for the period 1950-85. Report at 235; Kan. Exh. 111* (12/6/90) (Comparison "F"). The revised version of the model calculated total depletions of Stateline flows from post-compact well pumping in Colorado of 852,000 acre-feet. Kan. Exh. 111 * * * (Historical Pumping). Based on the results of the original model, the Kansas claim for the combined effects of post-compact pumping and the Winter Water Storage Program (after transmountain return flows had been accounted for and depletions were limited to depletions of usable Stateline flows) was 917,000 acre-feet. Report at 235. The Kansas claim based on the revised model was reduced to 489,000 acre-feet. *Id.* at 237, 256. However, this amount was based on a new method to calculate depletions to usable Stateline flows. *Id.* at 255.

When depletions to usable Stateline flows were calculated using the method Mr. Durbin had developed and which the Master concluded was the best of several methods presented, Kansas' claim was reduced to 365,400 acre-feet, *id.* at 256 note 97, 40 percent of the original claim.

All of these results were based on Kansas' estimates of post-compact well pumping in Colorado and Kansas' assumption about the amount pre-compact wells in Colorado were entitled to pump after the Compact became effective (*i.e.*, 11,000 acre-feet per year). Report at 183, 202 & note 70. When Colorado's estimates of post-compact well pumping and the amounts pre-compact wells in Colorado were entitled to pump after the Compact became effective were used in the model, the depletions calculated by the model dropped substantially. For example, when reduced to depletions of usable Stateline flows using the Durbin usable flow analysis with the Larson coefficients, which the Master concluded was the best of the methods presented, depletions from post-compact well pumping dropped from 355,900 acre-feet to 230,900 acre-feet. Colo. Exh. 975, Comparisons 6 and 5. When accretions to usable Stateline flows predicted by the model were considered, net depletions dropped to 194,800 acre-feet. *Id.*, Comparison 5. Moreover, these amounts do not include increases to usable Stateline flows resulting from the 1980 Operating Plan for John Martin Reservoir.

While Colorado's experts conceded that post-compact well pumping in Colorado had depleted Stateline flows to some extent, Colorado showed, and the Master found, that Kansas had known about post-compact well

pumping in Colorado for many years, but did not complain about such pumping until 1984, at the earliest. Report at 155-56. Nevertheless, the Master rejected Colorado's defense of laches. *Id.* at 170. Colorado also showed that the Operating Plan for John Martin Reservoir, which was adopted by the Compact Administration in 1980, had increased usable Stateline flows. The Master concluded, however, that the 1980 Plan was not a bar to Kansas' claims and that increases in usable Stateline flows resulting from the Plan should not offset depletions of usable Stateline flows caused by post-compact well pumping. *Id.* at 180-81.

Although the Master concluded that post-compact well pumping in Colorado had violated the Compact and rejected Colorado's equitable defenses, he did not make a finding of the amount of the depletions to usable Stateline flows from post-compact well pumping in Colorado. He did not do so for several reasons. First, he ruled that the "pre-compact pumping allowance" used in the Kansas model should be increased from 11,000 acre-feet per year to 15,000 acre-feet per year and that the post-compact pumping estimates used in the model should be modified for some Colorado adjustments. Report at 199-200, 219. Second, he questioned the comparison used by the Kansas replacement experts to calculate depletions with the revised model. *Id.* at 259-60. Third, he felt that additional evidence was necessary on the issue of accretions to usable Stateline flows calculated by the model. *Id.* at 260, 262-63. Thus, if the Court affirms his rulings on the liability phase, the Master recommends that the case be remanded for further evidence to quantify depletions

to usable Stateline flows and for completion of the remedy phase. *Id.* at 290, 337.

SUMMARY OF ARGUMENT

1. Kansas delayed 29 years after it knew or, in the exercise of reasonable diligence, should have known of facts giving rise to a claim against Colorado for post-compact well pumping in Colorado; Kansas had no justifiable excuse for its delay; and Colorado was prejudiced by Kansas' delay. The policy disfavoring the untimely assertion of rights which underlies the defense of laches is applicable against a state in a controversy between states in this Court. The considerations of public policy which support application of the rule *nullum tempus* to a domestic sovereign when it sues in its own courts are not controlling in a controversy between states in this Court. While Kansas may not be barred from seeking prospective relief, Kansas should be barred from claiming damages prior to 1985 when it first requested an investigation of post-compact well pumping by the Arkansas River Compact Administration.

2. Article IV-D of the Arkansas River Compact does not limit pre-compact wells in Colorado to pumping the highest amount pumped during the pre-compact period. Moreover, the USGS estimates of pumping used by the Special Master to determine the highest amount pumped are not reasonable because there is no data to support those estimates, the estimates are inconsistent with power data that is available, and the person who made those

estimates had died and was not available to explain the data and assumptions used to make those estimates.

3. Under general principles of contract law, increases in usable Stateline flows resulting from the adoption of the 1980 Operating Plan for John Martin Reservoir should offset depletions to usable Stateline flows caused by post-compact well pumping in Colorado.

4. The standard of proof in a controversy between states involving an alleged breach of an interstate compact should be the "clear and convincing" standard, which reflects the significant interest society has in the outcome of such suits and guards against erroneous factual determinations.

ARGUMENT

I. KANSAS' CLAIM FOR DAMAGES SHOULD BE BARRED BY LACHES

In its Answer, Colorado raised laches as an affirmative defense. Report-App. at 32, ¶ 2. In proceedings before the Special Master, Kansas took the position that laches was not applicable against a state. Report at 149. *See Illinois v. Kentucky*, 500 U.S. 380, 388 (1991) ("The Special Master correctly observed that the laches defense is generally inapplicable against a State."); *Block v. North Dakota*, 461 U.S. 273, 294 (1983) (O'Connor, J., dissenting) ("The common law has long accepted the principle *'nullum tempus occurrit regit'* – neither laches nor statutes of limitations will bar the sovereign.").

Special Master Littleworth noted that no interstate compact enforcement case had been found in which the Supreme Court had directly held that laches does or does not apply against a state. Report at 150. He said that one argument in favor of applying laches is that the Court has described its jurisdiction in cases between states as "basically equitable in nature." *Id., quoting Ohio v. Kentucky*, 410 U.S. 641, 648 (1973). He noted, however, that even in equity cases, it is generally held that laches does not apply against a public agency. Report at 150.[21]

The Master concluded, however, that it would be a mistake to decide the issue solely on the basis of "conventional rules of equity." Report at 150. He said that in exercising the "unprecedented" grant of judicial power over controversies between states, "the inquiry really is one of fundamental justice rather than what is the historical or even the current practice of courts exercising less extraordinary powers." *Id.* at 151. Noting cases between states which had referred to a policy disfavoring the untimely assertion of rights,[22] he concluded:

> Clearly, although it is not based on equity jurisprudence as such, the rule to be followed here is that there is some point at which unexcused delay by a state in connection with an interstate apportionment will work to bar relief.

Id. at 152.

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[21] More accurately stated, the rule is that laches does not bar the government when suing to enforce public rights, at least when the government sues in its own courts. *Guaranty Trust Co. v. United States*, 304 U.S. 126, 132-36 (1938).

[22] *Illinois v. Kentucky*, 500 U.S. at 388; *Colorado v. Kansas*, 320 U.S. 383, 394 (1943); *Washington v. Oregon*, 297 U.S. 517, 528-29 (1936); *Missouri v. Illinois*, 200 U.S. 496, 520 (1906).

Although the Master concluded that this rule (which will be referred to as laches[23]) could be applied against a state, he ruled that Kansas had not been guilty of inexcusable delay in making its well claim and that Colorado had not been prejudiced by Kansas' failure to press its claim earlier. Report at 170. Colorado takes exception to these latter rulings.

A. LACHES CAN BE APPLIED AGAINST A STATE IN A CONTROVERSY BETWEEN STATES

Laches is an equitable doctrine which is designed to prevent stale claims for the peace, repose, and welfare of society. As the Court said in *Brown v. County of Buena Vista*, 95 U.S. 157, 161 (1877):

> The law of laches, like the principle of the limitation of actions, was dictated by experience. . . . The lapse of time carries with it the life and memory of witnesses, the muniments of evidence and other means of proof. The rule which gives it the effect prescribed is necessary to the peace, repose and welfare of society.

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[23] International law recognizes laches through the principle of "extinctive prescription." 1 *Oppenheim's International Law* §155c, at 349 (Lauterpacht ed., 8th ed. 1955) ("The principle of extinctive prescription, that is the bar of claims by lapse of time, is recognized in International Law."); I. Brownlie, *Principles of Public International Law* 504 (4th ed. 1990) ("The lapse of time in presentation may bar an international claim in spite of the fact that no rule of international law lays down a time limit.").

See also Penn Mutual Life Ins. Co. v. Austin, 168 U.S. 685, 696-99 (1898) (collecting cases); *Gillons v. Shell Co. of California*, 86 F.2d 600, 609-10 (9th Cir. 1936), *cert. denied*, 302 U.S. 689 (1937) (collecting cases).

The rule that a sovereign is exempt from the operation of statutes of limitations and the consequences of laches (*quod nullum tempus occurrit regit*) has been described as "a vestigial survival of the prerogative of the Crown." *Guaranty Trust Co. v. United States*, 304 U.S. 126, 132 (1938). This judicially created rule continues to be applied by courts in the United States, however, because it furthers the public policy of protecting rights vested in the government (federal or state) from injury and loss by the inadvertence of agents upon which the government must necessarily rely. *Block v. North Dakota*, 461 U.S. at 290; *Guaranty Trust*, 304 U.S. at 132; *United States v. Hoar*, 26 F.Cas. 329 (C.C.D.Mass. 1821) (Story, J.).

The rule *nullum tempus* is not applied in every suit brought by a sovereign, however. When a foreign sovereign sues in our courts, the rule is not applied to shield the foreign sovereign from the operation of statutes of limitation or the consequences of laches. *Guaranty Trust*, 304 U.S. at 135-36. It is therefore important to consider the reason a foreign sovereign is not immune from the operation of statutes of limitation or the consequences of laches when it sues in our courts.

In *Guaranty Trust* the Court noted that, based on the principle of comity, a foreign sovereign is not amenable to suit in our courts without its consent. 304 U.S. at 134. But, the Court pointed out, a foreign sovereign which voluntarily appears in our courts abandons its immunity from

suit and subjects itself to the rules of decision of the forum which it has sought. *Id.* The Court then held that the public interest of the forum did not require the application of the rule *nullum tempus* to a foreign sovereign and the community which it represents. *Id.* at 136. For similar reasons, it would be improper to apply the rule *nullum tempus* in a controversy between states in this Court.

When a state invokes the jurisdiction of this Court to resolve a controversy between states, it is in a position similar to a foreign sovereign which voluntarily appears in the courts of another sovereign. As Justice Story said in *Rhode Island v. Massachusetts*, 37 U.S. (12 Pet.) 657, 751 (1838):

> When, too, the highest courts of a kingdom [*i.e.*, England] have most solemnly declared . . . that when a foreign king is a plaintiff, in a court of equity, it can do complete justice; impose any terms it thinks proper; has him in its power, and completely under its control and jurisdiction . . . ; we ought not to doubt as to the course of a State of this Union; as a contrary one would endanger its peace, if not its existence. [Citation omitted.]

See also Texas v. New Mexico, 482 U.S. 124, 128 (1987) ("By ratifying the Constitution, the States gave this Court complete judicial power to adjudicate disputes among them, [citation omitted] and this power includes the capacity to provide one State a remedy for the breach of another.").

In invoking the jurisdiction of this Court to settle a controversy with another state, a state subjects itself to the rules of decision and the policies which govern the

exercise of jurisdiction by this Court. *Rhode Island v. Massachusetts*, 37 U.S. (12 Pet.) at 737. The framers of the Constitution extended the judicial power of the United States to controversies between states, and gave this Court original jurisdiction of cases in which a state is a party, to provide a peaceful means of settling such disputes. *Georgia v. Pennsylvania R.R. Co.*, 324 U.S. 439, 450 (1945); *Principality of Monaco v. Mississippi*, 292 U.S. 313, 328 (1934); *North Dakota v. Minnesota*, 263 U.S. 365, 372-73 (1923); *Kansas v. Colorado*, 185 U.S. 125, 140 (1902); *Rhode Island v. Massachusetts*, 37 U.S. (12 Pet.) at 725.[24]

In a controversy between states, "this court is called upon to settle that dispute in such a way as will recognize the equal rights of both and at the same time establish justice between them." *Kansas v. Colorado*, 206 U.S. 46, 98 (1907); *see also Rhode Island v. Massachusetts*, 37 U.S. (12 Pet.) at 737. It would be inconsistent with the equality of states and would not establish justice between them for this Court to fail to consider the unexcused delay by a state in asserting its rights and the prejudice to a defendant state from failure to press the claim earlier.

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[24] *See* The Federalist, No. 80, at 534 (J. Cooke ed. 1961) ("It seems scarcely to admit of controversy that the judiciary authority of the union ought to extend to these several descriptions of causes. . . . 4th. to all those which involve the PEACE of the CONFEDERACY, whether they relate to the intercourse between the United States and foreign nations, or to that between the States themselves; . . . "). For a discussion of the unique and unprecedented nature of this grant of jurisdiction, see C. Warren, *The Supreme Court and Sovereign States* 32-37 (1924).

And, as the cases cited by the Master show, the Court has taken into account the policy disfavoring the untimely assertion of rights in weighing the equities and establishing justice between states. *E.g., Colorado v. Kansas*, 320 U.S. at 394 ("These facts [Kansas' delay while improvements based on irrigation went forward for twenty-one years] might well preclude the award of the relief Kansas asks. But, in any event, they gravely add to the burden she would otherwise bear, and must be weighed in estimating the equities of the case.")[25]; *Washington v. Oregon*, 297 U.S. at 528-29 ("Here surely is not the diligence that equity exacts of the suitor who invokes its distinctive jurisdiction."); *Missouri v. Illinois*, 200 U.S. 496, 520 (1906) ("It would be contradicting a fundamental principle of human nature to allow no effect to the lapse of time, however long."); *see also Nebraska v. Wyoming*, 507 U.S. ___, ___, 113 S.Ct. 1689, 1691, 123 L.Ed.2d 317, 332 (1993) (arguments foreclosed by post decree acquiescence); *Virginia v. West Virginia*, 206 U.S. 290, 321 (1907) (failure to enter upon the performance under alleged compact for forty-three years).[26]

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[25] Unlike the Court in *Colorado v. Kansas*, the Master did not require Kansas to prove its case by clear and convincing evidence, but only by a preponderance of the evidence. Report at 69-70. Kansas' delay should "gravely add to the burden she would otherwise bear" and "must be weighed in estimating the equities of the case." Applying laches is the appropriate way to do so.

[26] The reasons for applying the rule *nullum tempus* are strongest when the government seeks to protect rights to lands held as sovereign in trust for the public. *Weber v. Board of State Harbor Comm'rs*, 85 U.S. 57 (1873). Yet, even in boundary cases between states, the policy disfavoring the untimely assertion of rights applies through the doctrines of prescription and acquiescence. *Illinois v. Kentucky*, 500 U.S. at 388. The reason for these separate doctrines in boundary disputes is that unreasonable delay in the assertion of rights will confer jurisdiction and title on another sovereign. *Rhode Island v. Massachusetts*, 37 U.S. (12 Pet.) at 734 ("[A]ll dependent rights are settled when boundary is."). Thus, as with adverse possession, the delay in boundary cases must be substantial before it will constitute prescription or acquiescence. On the other hand, in a dispute where untimely delay only bars a claim for compensation for past injury rather than future enforcement of rights, the delay should be much less to constitute unreasonable delay. *See* I. Brownlie, *Principles of Public International Law* 153, 505 (4th ed. 1990) (distinguishing the principle of "extinctive prescription" (laches) from the doctrine of prescription and acquiescence applied in territorial disputes in International Law).

Moreover, it would not serve the Court's primary responsibility as an appellate court to ignore the policy disfavoring the untimely assertion of rights and the prejudice to the defendant state which may arise from delay in interstate compact cases. To apply the rule *nullum tempus* would permit states to dredge up stale claims for damages for violation of interstate compacts and burden this Court with cases which are difficult to determine because of the lapse of time and the loss of evidence. Such cases may also present difficult issues concerning enforcement of the Court's decision.[27]

Thus, it would not lead to the just and equitable settlement of controversies between states, it would not

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[27] For example, it is one thing to order a state to pay money damages or repay past under-deliveries of water where there has been an ongoing, albeit good-faith, dispute over obligations under a Compact, as in *Texas v. Mexico*, 482 U.S. at 129-31. It is another thing to impose such a remedy on a state which had no reason to believe it would be sued.

promote the peace of the Union, and it would not serve the Court's primary responsibility as an appellate court to hold that laches cannot be applied against a state in a controversy between states in this Court involving a claim for breach of an interstate compact.

B. KANSAS WAS GUILTY OF LACHES IN MAKING ITS WELL CLAIM

Although the Special Master ruled that Kansas' delay, if unexcused, could bar relief, he concluded that Kansas should not be barred by laches from obtaining relief because of its failure to press its well claim earlier. Report at 170.

In reaching this decision, the Master made two preliminary findings. First, he found that there was no substantial evidence that Kansas knew or should have known about the extent or effect of post-compact well pumping in Colorado before 1968. Report at 169.[28] Second, he found that the record supported Colorado's assertion that Kansas had made no complaint about well pumping in Colorado to the Compact Administration, or indeed to any appropriate Colorado officials, before 1984,

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[28] Although it is not entirely clear from the Report, the Master apparently found that Kansas knew or should have known about the extent of post-compact well pumping in Colorado in 1968 because in that year a report was published at the direction of the Colorado legislature (the "Wheeler Report") which contained estimates of pumping between 1940 and 1965. Report at 159-60.

if the Simons, Li report[29] was considered as such, or otherwise before 1985, when Kansas asked the Compact Administration to undertake an investigation under Article VIII-H of the Compact. *Id.* at 155-56.

Notwithstanding the fact that Kansas had delayed for at least 16 years in making a complaint (1968 to 1984), the Master concluded "that Kansas has not been guilty of inexcusable delay in making its well claim, and that Colorado has not been prejudiced by Kansas' failure to press its claim earlier." Report at 170. Colorado takes exception to these findings. While the Master's findings on these issues may deserve respect, the ultimate responsibility for deciding what are correct findings of fact remains with the Court. *Colorado v. New Mexico*, 467 U.S. 310, 317 (1984). This is particularly true where the Master has misapprehended the considerations which govern the decision. *Id.* at 323.

Cases applying laches provide helpful guidance in this case.[30] Laches has been defined as "the neglect or

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[29] In September 1983, Kansas hired Simons, Li & Associates, Inc., an engineering firm, to make an investigation into declining Stateline flows. Jt. Exh. 88 at 1.1. The report was completed in 1984 and provided to Colorado in June of that year. Exhibit 23 to Colorado's Motion to Stay Based on Kansas' Failure to Exhaust Its Administrative Remedies (filed May 13, 1988). The report formed the basis for Kansas' request for a special meeting of the Arkansas River Compact Administration on March 28, 1985, at which it requested an investigation of alleged Compact violations by Colorado. Exhibit 24 at 6 to Colorado's Motion to Stay.

[30] So far as Colorado is aware, there is no statute of limitations that applies to claims for breach of interstate compact

delay in bringing suit to remedy an alleged wrong, which taken together with lapse of time and other circumstances, causes prejudice to the adverse party and operates as an equitable bar." *A.C. Aukerman Co. v. R.L. Chaides Const. Co.*, 960 F.2d 1020, 1028-29 (Fed.Cir. 1992). *Accord Costello v. United States*, 365 U.S. 265, 282 (1961); *Gardner v. Panama R.R. Co.*, 342 U.S. 29, 31 (1951); *Holmberg v. Armbrecht*, 327 U.S. 392, 396 (1946); *Russell v. Todd*, 309 U.S. 280, 287 (1940); *Southern Pac. Co. v. Bogert*, 250 U.S. 483, 488-89 (1919).[31]

Historically, laches developed as an equitable defense based on the maxim *vigilantibus non dormientibus aequitas subvenit* (equity aids the vigilant, not those who sleep on their rights). *Stone v. Williams*, 873 F.2d 620, 623 (2d Cir. 1989), *cert. denied*, 493 U.S. 959 (1989); *Independent Bankers*

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generally or to breach of the Arkansas River Compact specifically. *See* Report at 164 note 58. However, the jurisdiction of the Court is "basically equitable in nature," *Ohio v. Kentucky*, 410 U.S. 641, 648 (1973), and this Court has looked to doctrines of equity as guides to decisions in cases between states. *Texas v. Florida*, 306 U.S. 398, 405 (1939); *see also Vermont v. New York*, 417 U.S. 270, 277 (1974); *Massachusetts v. Missouri*, 308 U.S. 1, 15 (1939).

[31] In recent years, decisions by Federal Courts of Appeal have distinguished the elements necessary to establish laches from the elements necessary to establish estoppel, something not always clear in older cases applying laches. The distinction is important because it carries over into the effects that the two defenses have on litigation. *E.g., Studiengesellschaft Kohle v. Eastman Kodak Co.*, 616 F.2d 1315, 1326 (5th Cir. 1980); *Advanced Hydraulics, Inc. v. Otis Elevator Co.*, 525 F.2d 477, 479 (7th Cir.), *cert. denied*, 423 U.S. 869 (1975). For that reason, Colorado believes that recent Court of Appeals decisions are particularly helpful on the issue of laches.

Assn. of America v. Heimann, 627 F.2d 486, 488 (D.C.Cir. 1980) (per curiam).

The length of time which may be deemed unreasonable has no fixed boundaries, but rather depends on the circumstances of each case. *Young v. The Key City*, 81 U.S. (14 Wall.) 653, 660 (1872); *Aukerman*, 960 F.2d at 1032 and cases cited therein; *Goodman v. McDonnell Douglas Corp.*, 606 F.2d 800, 805-06 (8th Cir. 1979), *cert. denied*, 446 U.S. 913 (1980). While a statute of limitations may provide a frame of reference, it is not controlling as a measure of equitable relief. *Holmberg v. Armbrecht*, 327 U.S. at 396. As the Court said in that case:

> Such statutes have been drawn upon by equity solely for the light they may shed in determining that which is decisive for the chancellor's intervention, namely, whether the plaintiff has inexcusably slept on his rights so as to make a decree against the defendant unfair. See *Russell v. Todd, supra* (309 US [280] at 289, 84 L.Ed. 761, 60 S.Ct. 527 [(1940)]). "There must be conscience, good faith, and reasonable diligence to call into action the powers of the court." *McKnight v. Taylor*, 1 How (U.S.) 161, 168, 11 L.Ed. 86, 88 [(1843)]. A federal court may not be bound by a State statute of limitation and yet that court may dismiss a suit where the plaintiffs' "lack of diligence is wholly unexcused; and both the nature of the claim and the situation of the parties was such as to call for diligence. . . ." *Benedict v. New York*, 250 U.S. 321, 328, 63 L.Ed. 1005, 1011, 39 S.Ct. 476 [(1919)].

Holmberg v. Armbrecht, 327 U.S. at 396.

For the purpose of laches the relevant time period begins to run when the plaintiff knew or, in the exercise of reasonable diligence, should have known of the facts giving rise to its claim. *Aukerman*, 960 F.2d at 1032; *White v. Daniel*, 909 F.2d 99, 102 (4th Cir. 1990); *Jensen v. Western Irrigation & Mfg., Inc.*, 650 F.2d 165, 168 (9th Cir. 1980); *Studiengesellschaft Kohle v. Eastman Kodak Co.*, 616 F.2d 1315, 1326 (5th Cir. 1980). Laches will not be imputed to one who has been justifiably ignorant of facts which create a cause of action, but a plaintiff must be diligent and make such inquiry and investigation as the circumstances suggest. *Benedict v. New York*, 250 U.S. 321, 328 (1919); *City of New Albany v. Burke*, 78 U.S. (11 Wall.) 96, 107 (1871); *Studiengesellschaft Kohle*, 616 F.2d at 1326; *Potash Co. of America v. International Minerals & Chemical Corp.*, 213 F.2d 153, 155 (10th Cir. 1954).

1. Kansas Knew or Should Have Known of the Facts Giving Rise to Its Claim by 1956

The first question in the laches analysis is whether Kansas was diligent in asserting its rights from the time it knew or, in the exercise of reasonable diligence, should have known of its claim. *Aukerman*, 960 F.2d at 1032; *White v. Daniel*, 909 F.2d at 102. The Master found that "[t]he extent of postcompact well pumping in Colorado was not generally known until approximately 1968, and there is no substantial evidence that Kansas knew or should have known about the extent or effect of such well development before that time." Report at 169. Colorado takes exception to this finding.

The record in this case establishes that evidence of increased post-compact well development and pumping in Colorado was available long before 1968. The precise extent of such well development and pumping may not have been known prior to 1968, but the fact that the number of wells and the amount of pumping had increased substantially was public knowledge by 1956.

A January 1956 report prepared by the United States Geological Survey ("USGS") on ground water and the status of investigations in Colorado stated:

> Ground water has long been used in Colorado for domestic, industrial, and municipal supplies but until recently it was used only on a minor scale for irrigation. With the development of efficient pumps, engines, and motors and the availability of cheaper electricity and petroleum products for fuel, *the pumping of ground water for irrigation has grown by leaps and bounds since the early 1930's and is continuing to grow at an ever-accelerated pace. Data accumulated to date indicate that the number of irrigation wells in Colorado increased by about 150 percent between 1940 and 1953. . . .*

Colo. Exh. 95 at 4-5 (emphasis added).

With specific reference to ground water in the Arkansas River Basin, the January 1956 report stated:

> The alluvium and terrace deposits of the Arkansas Valley and its principal tributaries constitute an important aquifer in Colorado, but few data concerning the extent of development are available. On the basis of an inventory of irrigation wells made in the main stem of the valley in 1942 and of later detailed studies in

> some of the tributary valleys, *it is estimated that there are now 1,000 irrigation wells which discharge about 165,000 acre-feet of water annually for the irrigation (largely supplemental) of more than 100,000 acres of land.*

Colo. Exh. 95 at 7-8 (emphasis added). Duane D. Helton, one of Colorado's principal experts, Report at 145 note 57, relied on this report to show that development of wells in Colorado was common knowledge in 1956. RT Vol. 115 at 96-97.[32]

In December 1956, the Arkansas River Compact Administration "held considerable discussion concerning the activity of well drilling and its effect on conditions." Minutes of the Arkansas River Compact Administration

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[32] The January 1956 report was one of a series of reports published by the Colorado Water Conservation Board for use by the public and federal and state agencies as part of cooperative investigations with the USGS. Colo. Exh. 95 at 1; RT Vol. 81 at 87-91 (Helton) (describing history of cooperative studies with the USGS). The Colorado Water Conservation Board is a Colorado state agency with the duty to promote the conservation of the waters of the State of Colorado. Colo.Rev.Stat. §37-60-101, *et seq*. The director of the Colorado Water Conservation Board is one of the three Colorado representatives to the Compact Administration. Arkansas River Compact, Art. VIII-C. The USGS conducts investigations and measurement of water resources throughout the nation, often in cooperation with state agencies. Colo. Exh. 95 at 1-3, 17. *See* Arkansas River Compact, Art. VIII-G(2) (the director of the USGS is requested to collaborate with the Compact Administration and state officials in the systematic determination and correlation of data). Prior to the cooperative investigations in Colorado, the USGS had done investigations of ground water resources in Hamilton, Kearny, and Finney Counties in Kansas, which were published by the State Geological Survey of Kansas. Kan. Exhs. 447 and 448.

Annual Meeting (Dec. 11, 1956) at 15 (Jt. Exh. 19). Other reports published before 1968 also noted the conversion to more efficient pumps and substantially increased post-compact well pumping in the Arkansas River Valley in Colorado. Jt. Exh. 61 at 3 ("With the advent of better well-drilling methods, efficient pumps and the availability of electrical power, the development of ground-water [in the Arkansas River Valley] to supplement surface-water supplies increased rapidly, particularly in the drouth period of the early 1950's.") (published April, 1963); Jt. Exh. 136 at 37, 39-40 (USGS Water-Supply Paper on ground water resources of Prowers County, Colorado, published 1965); Jt. Exh. 137 at 45-46 (USGS Water-Supply Paper on ground water resources of Crowley County, Colorado, published 1965).

Moreover, officials in Kansas were aware of well development in Colorado before 1968. Colorado offered the deposition of Howard C. Corrigan, the former Kansas Water Commissioner of the Garden City Field Office who was employed by the Kansas Division of Water Resources for almost 40 years.[33] Colo. Exh. 21. Mr. Corrigan was asked in his deposition:

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[33] Mr. Corrigan was employed by the Kansas Division of Water Resources from 1947 to 1987. Colo. Exh. 21 at 5-8. He was assigned to the Garden City office in 1947 and was the only representative of the Kansas Division of Water Resources in Garden City until 1949. *Id.* at 6. He was the assistant water commissioner in Garden City from 1949 to 1963, and water commissioner of the Garden City field office from 1963 until his retirement in 1987. *Id.* at 6-7. As water commissioner, he had responsibility for the administration of all water within southwestern Kansas, including operations under the Arkansas River

Q: When did you become aware of well development in the State of Colorado?

A: Oh, shoot, back in the '50's.

Colo. Exh. 21 at 121. He was also asked:

Q: . . . Did you ever discuss well development in Colorado with any of the Colorado officials?

A: Oh, yes, that was discussed many times. . . .

* * *

Q: Did you discuss it in terms of the affect [sic] of well development on stream flows?

A: That has been discussed, yes.

Q: Do you recall when those discussions occurred?

A: I can't give you dates, no.

Colo. Exh. 21 at 122. In response to an interrogatory by Colorado, Mr. Corrigan had been listed by Kansas as a person with knowledge of unregulated development of post-compact alluvial wells in Colorado. The following question and answer occurred during the deposition:

> Q. At the conclusion of Mr. Robbins' direct examination, . . . you were asked about an interrogatory question that Colorado had propounded to Kansas and you were asked, you

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Compact. *Id.* at 8-10. Kansas had planned to call him as a witness, RT Vol. 34 at 131; but he was hospitalized and was not called to testify. RT Vol. 39 at 6. Colorado then offered his deposition, which was admitted into evidence by the Master in a written order. Order Admitting Exhibits (Dec. 16, 1991).

> were listed as one who had knowledge of the first factor which is the unregulated development of post-Compact alluvial wells as contributing to material depletions at the state line. And I understood you to say that you had no knowledge of any facts in that regard. . . . Would you care to clarify your testimony on that point?
>
> A. Well, emphasizing the facts that I would have would be the various times of inspecting and going up into Colorado. I visually inspected the various development of wells and the wells that were drilled along the Arkansas River Basin which indirectly took water out of the river increasing the transit loss. . . . [E]ach and every year since the establishment of the Compact I have computed the transit losses. And a lot of it, I think, was due to a lot of this development of wells in the – along the Arkansas River Basin in the alluvial [sic].

Colo. Exh. 21 at 165-66. Colorado's counsel then followed up on this answer with the following questions:

> Q. And with regard to the post-Compact well development that you inspected a number of times in Colorado, when did that occur?
>
> A. That occurred all during the period of time from the '50's right on up to the – '87. I was up there at various times and there has been wells that have been developed just as I stated. . . .
>
> Q. And you inspected those periodically all through the '50's, '60's and '70's?
>
> A. It was noted during those periods of times, yes, at different times, and those wells were pumping.

Colo. Exh. 21 at 167.

The Master acknowledged that the depositions of Kansas' officials offered by Colorado showed that these men were aware of some well development in Colorado before 1968, and that some informal discussions had occurred within the Compact Administration. Report at 164.[34] However, he states that the evidence is "sketchy" and "does not demonstrate that these officials were aware of the number of wells, the extent of Colorado's pumping, or the impact or even potential impact of pumping on usable Stateline flows." *Id.*

The Master misconceives the issue. The issue is not whether these men had actual knowledge of the number of wells in Colorado, the precise extent of pumping in Colorado, or the impact or potential impact of pumping on usable Stateline flows. The issue is whether Kansas knew or, in the exercise of reasonable diligence, should have known of facts giving rise to its claim before 1968. *Aukerman*, 960 F.2d at 1032; *White v. Daniel*, 909 F.2d at

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[34] In fact, formal discussion of well drilling and its effect on conditions did occur at the annual meeting of the Compact Administration in 1956. Minutes of Arkansas River Compact Administration Annual Meeting (Dec. 11, 1965) at 15 (Jt. Exh. 19). Colorado also offered the deposition of Carl Bentrup, a farmer from Deerfield, Kansas, who was a Kansas representative to the Compact Administration from 1957 to 1988. Colo. Exh. 17 at 5-6, 34. Mr. Bentrup did not have knowledge of well development in Colorado in the 1950s, but testified that he remembered wells being drilled in Colorado in the 1960s. *Id.* at 46-47. He testified: "On tours you gradually noticed more wells." *Id.* at 47. "And," he said, "we were beginning to get quite concerned about wells in Colorado and I naturally was looking for them, noticing them on what tours we were taking." *Id.* Mr. Bentrup's deposition was admitted into evidence by the Master. Order Admitting Exhibits (Dec. 16, 1991).

102. Colorado offered the deposition of Mr. Corrigan to show that at least one key Kansas official knew about well development in Colorado in the 1950s, had made inspections in Colorado from the 1950s right up to 1987, had made computations of transit losses each year since the Compact was adopted, and believed that wells indirectly took water from the river increasing the transit losses and that a lot of the transit losses were due to wells.

Colorado's evidence was uncontroverted. Kansas did not call *any* witnesses to testify that Kansas was not aware of increased post-compact well development and pumping in Colorado in the 1950s or early 1960s or its potential impact on Stateline flows. In fact, Edward DeKeyser, a witness called by Kansas who was the superintendent of the Amazon Ditch in Kansas from 1939 to 1981, RT Vol. 33 at 65-67, testified that in 1956 his ditch company board became very concerned about the decline in Stateline flows and instructed him to go to Colorado to investigate, and that he made an investigation of well development in Colorado in 1956 from property tax records. *Id.* at 82-84.

Furthermore, Stateline flows declined substantially from 1952-56 and again in the early 1960s. Report at 142-43. While these declines may have been due in large part to drought and implementation of the Compact, the declines were sufficient to call for inquiry and investigation by Kansas, and in fact did result in an investigation by Mr. DeKeyser at the direction of his ditch company board in 1956. Moreover, there was "considerable discussion concerning the activity of well drilling and its effect

on conditions" by the Compact Administration at its annual meeting in December 1956. Minutes of the Arkansas River Compact Administration Annual Meeting (Dec. 11, 1956) at 15 (Jt. Exh. 19).

Laches will not be imputed to one who has been justifiably ignorant of facts which create his right or cause of action. *Studiengesellschaft Kohle*, 616 F.2d at 1326; *Potash*, 213 F.2d at 155. But ignorance will not of itself excuse delay. *Id.* "The party must be diligent and make such inquiry and investigation as the circumstances reasonably suggest, and the means of knowledge are generally equivalent to actual knowledge." *Potash*, 213 F.2d at 155; *Benedict v. New York*, 250 U.S. at 328; *see also City of New Albany v. Burke*, 78 U.S. (11 Wall.) at 107 (possession of the means of knowledge of fraud is in equity tantamount to knowledge itself).

Applying these principles to this case, it is clear that whether or not Kansas actually knew of the number of wells, the precise extent of pumping in Colorado, or the impact or potential impact of post-compact well pumping in Colorado on usable Stateline flows prior to 1968, it had sufficient knowledge, or the means of knowledge, to call for an inquiry and an investigation of post-compact well pumping in Colorado by 1956. The report published in January 1956, the declines in Stateline flows from 1952-56, the inspections made by Mr. Corrigan, the investigation undertaken by Mr. DeKeyser in 1956, and the discussion at the Compact Administration's annual meeting in 1956 demonstrate that sufficient information was available to Kansas to call for an inquiry and an investigation of post-compact well pumping at that time. Further, Colorado and the USGS continued to publish information about

well development in the Arkansas River Valley in Colorado from 1956 to 1968. Jt. Exhs. 61, 67-69, 136, 137. Several of these reports noted the conversion to more efficient pumps and increased well development and pumping in Colorado. Jt. Exh. 61 at 3; Jt. Exh. 136 at 37, 39; Jt. Exh. 137 at 45.

The Master states, however, that none of the reports relating to well pumping in Colorado deals with the issue of impact on *usable* Stateline flow. Report at 161. Once again, this is not the relevant inquiry. The issue is whether Kansas had sufficient information to investigate and determine if a Compact violation existed. *Potash*, 213 F.2d at 155; *Pearson v. Central Ill. Light Co.*, 210 F.2d 352, 356-57 (7th Cir. 1954); *Naxon Telesign Corp. v. Bunker Ramo Corp.*, 517 F. Supp. 804, 808 n. 3 (N.D.Ill. 1981), *aff'd, in part*, 686 F.2d 1258 (1982) ("Even if Naxon had been 'unsure' of the infringement, it had a duty to promptly investigate and determine if infringement existed.").

The *potential* impact of an increase in well pumping in Colorado was known by officials in Kansas prior to the Compact. Kan. Exh. 205A at 1-2 (letter dated July 13, 1940, from George S. Knapp to W.E. Stanley describing how Colorado could increase consumption without increasing irrigated acreage by increasing well pumping); *see also* Kan. Exh. 448 at 39-69, 78-80 (1943 report prepared by the USGS on ground water resources of Hamilton and Kearny Counties, Kansas, discussing principles governing the occurrence and movement of ground water and the effect of pumping on water levels and stream flow).[35]

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[35] Moreover, Colorado was prejudiced in proving that Kansas had actual knowledge of increases in post-compact well

Thus, by 1956, Kansas had sufficient information about increased well pumping in Colorado and its potential impact on usable Stateline flows to call for an investigation to determine if a Compact violation existed. Yet Kansas did nothing until 1983 when it hired Simons, Li to make an investigation of declining Stateline flows, and made no request for an investigation by the Compact Administration until 1985. Kansas delayed 29 years (1956-1985) in making a request for an investigation by the Compact Administration after it knew or, in the exercise of reasonable diligence, should have known of facts giving rise to its claim, a delay longer than its 21-year delay in *Colorado v. Kansas*, 320 U.S. at 394.

The Master was unwilling to find that Kansas delayed unreasonably in asserting its rights because neither state seemed to be aware that well pumping in Colorado depleted usable Stateline flows. He states:

> Colorado also accuses Kansas of sleeping on its rights, saying that is the issue. . . . This latter argument, however, seems to undercut Colorado's reliance on its own good faith. At least,

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pumping in Colorado by 1956 and the potential impact of such increases on usable Stateline flow because key witnesses from that period, including Robert V. Smrha, William E. Leavitt, and Roland H. Tate, had died. Report at 158-59. Smrha was the Kansas Chief Engineer from 1951 to 1972, the chief state official charged with the administration of water rights in Kansas. *See* Arkansas River Compact, Art. VIII-C. As the Kansas Chief Engineer, Smrha was a Kansas representative to the Compact Administration from 1951 to 1972. *See* Annual Reports of the Arkansas River Compact Administration for the years 1951 to 1972 (Jt. Exh. 18). Leavitt and Tate were Kansas representatives to the Compact Administration from 1949 to 1957. *Id.*

> Colorado's argument requires that Kansas recognize a potential compact violation while Colorado is excused.

Report at 165.

The Master confuses two distinct issues. Colorado never suggested that there was no evidence of a potential Compact violation. However, several Colorado witnesses testified that, in their opinion, pumping by wells upstream from Colorado ditches reduced diversions by Colorado ditches, not Stateline flows, or that depletions caused by well pumping were offset by transmountain return flows. RT Vol. 66 at 44-47 (Miles); RT Vol. 78 at 61-62, 85-86 (Danielson); RT Vol. 84 at 51-52, Vol. 115 at 62-63 (Helton).[36] Dr. Jeris A. Danielson, the Colorado State Engineer from 1979-1992, testified that his predecessor as State Engineer, C.J. Kuiper, had continued to issue well permits near the Stateline in the 1970s because of his belief that there was still a substantial amount of unused water passing Garden City and because Kansas was allowing wells to be drilled in Kansas. RT Vol. 76 at 112-15. Thus, Colorado argued that its officials believed in good faith that post-compact well pumping did not violate the Compact. *See Aukerman*, 960 F.2d at 1033 (a good-faith belief in the merits of a defense may tilt matters in the defendant's favor). However, the fact that

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[36] The Master agrees that transmountain return flows offset some depletions in Colorado: "The compact does not cover transmountain imports, and Kansas has acknowledged that it makes no claim to such water. However, the return flows from such imports do add to the Arkansas River supply and do act to offset depletions caused by use in Colorado." Report at 257.

Colorado officials believed in good faith that post-compact well pumping did not violate the Compact does not in any way detract from the fact that for 29 years Kansas knew or, in the exercise of reasonable diligence, should have known of facts giving rise to its claim.[37]

2. Kansas Has No Valid Excuse for its Lengthy Delay

Once it is established that Kansas had delayed for a lengthy period of time in making a complaint about post-compact well pumping in Colorado, the inquiry shifts to whether Kansas had a justifiable excuse for its delay. Although there was no specific evidence to explain why Kansas did not complain sooner, Report at 170, the Master speculated that:

> . . . Kansas may well have been relying upon the slowly developing regulatory system in Colorado for protection. This program was evolving all through the 1970s, . . . It is true that the implementation of this requirement has proved lacking, but that result could not have been known at the outset.

Id. Having posited that Kansas was relying upon Colorado's efforts to regulate pumping, the Master ruled that Kansas' reliance on Colorado was a justifiable excuse for not making a complaint:

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[37] Moreover, to the extent the Master focused on Colorado's actions rather than Kansas' delay, he distorted the basic concept of laches. *Aukerman*, 960 F.2d at 1031-32. Laches focuses on the dilatory conduct of the plaintiff and the prejudice which the plaintiff's delay has caused. *Id.*

> I think that Kansas had a right to rely, at least initially, upon the Colorado efforts to regulate pumping, and the law should not penalize a state under those circumstances. . . . Moreover, equitable defenses should not be applied in ways to encourage or force early litigation between states, particularly when a state is implementing efforts to address the problem.

Report at 170.

The reasons suggested by the Master are not justifiable excuses for Kansas' lengthy delay in making a complaint. First, there is no evidence in the record that Kansas was relying upon "the slowly developing regulatory system in Colorado for protection" or that Colorado's actions had anything to do with Kansas' decision not to complain. *See Potash*, 213 F.2d at 159. Kansas knew or had reason to know of increased well development and pumping in Colorado by at least 1968 or, if Colorado is correct, much earlier. For at least 16 years after it knew or had reason to know of facts giving rise to its claim, Kansas did not request an investigation by the Compact Administration, it made no complaint to appropriate Colorado officials, and it did not state that it was forebearing from making a complaint in reliance on actions being taken by Colorado. Nothing put Colorado on notice that Kansas was concerned about the possible effects of well pumping or that Colorado was at risk of being sued for a Compact violation.

Second, Colorado was implementing efforts to address the impacts of well pumping on senior surface rights in Colorado, not Stateline flows. Report at 133,

162.[38] If Kansas was relying on Colorado's efforts to address a *Compact* violation, Kansas should have at least informed Colorado of its intent to pursue a claim in the event actions by Colorado were unsuccessful. *Cf. Studiengesellschaft Kohle*, 616 F.2d at 1328. This is not a case where Kansas had complained and Colorado was implementing measures to address the problem. Kansas simply did nothing until 1984, when it furnished Colorado with a copy of the Simons, Li report.

Moreover, Kansas could have investigated a possible Compact violation without bringing litigation. The Arkansas River Compact created an interstate agency which had authority to investigate violations of the Compact, Arkansas River Compact, Art. VIII-A, VIII-H, and Kansas was represented on the Compact Administration by the Kansas Chief Engineer, the chief state official charged with administration of water rights, and by two local water right owners. *Id.*, Art. VIII-C. Further, during the lengthy period that Kansas delayed in making a complaint, it made no effort to have the Compact Administration or the USGS collect or preserve evidence that would be needed to determine its claim, including power records, power coefficients, tributary inflows, and flows at Garden City. *See* Arkansas River Compact, Art. VIII-

[38] While the Colorado State Engineer believed that well pumping had reduced flows of the Arkansas River in Colorado available to senior Colorado ditches, he also believed that there was a substantial amount of water passing Garden City unused. RT Vol. 76 at 112-15 (Danielson). Thus, the Colorado State Engineer did not adopt regulations to protect Stateline flows. *Id.* at 84-86 (Danielson). *See* Report at 161-62.

G(1), VIII-G(2). Under the circumstances, reliance on Colorado's efforts to regulate pumping for protection is not a justifiable excuse for Kansas' delay.

The Master appeared to be unwilling to find that Kansas' delay was inexcusable because in *Texas v. New Mexico*, 482 U.S. 124 (1987), the Court held that New Mexico could not escape liability for past failures to perform its duties under the Compact based on good-faith differences about the scope of undertakings under the Compact. Report at 165-66. In that case, however, Texas brought its concerns to the attention of the Pecos River Compact Commission in 1957. *Texas v. New Mexico*, 462 U.S. 554, 560-61 (1983). Thereafter, Texas continued to try to resolve its concerns through the Compact Commission until, in 1974, it finally brought suit against New Mexico. *Id.* at 561-62. Moreover, contrary to the Master's belief, Report at 167, New Mexico did raise the defense of laches, which was rejected by Special Master Jean S. Breitenstein:

> Texas had asserted its claims in the administrative forum for many years before bringing this suit. The continued efforts of Texas to have the Commission adopt its position does not preclude it from bringing this action. Otherwise, Supreme Court litigation would replace negotiation. The Master rejects the defense of laches.

Report of Special Master on His Decision and Supplemental Decision Regarding the Affirmative Defenses of New Mexico to the Complaint of Texas, *Texas v. New Mexico*, No. 65, Original (Oct. Term 1975) at 13 (May 6, 1979).

In this case, Kansas had not asserted its claims in the administrative forum for many years before bringing this

suit. *Cf. Gull Airborne Instruments, Inc. v. Weinberger*, 694 F.2d 838, 844 n. 8 (D.C. Cir. 1982) (plaintiff's many attempts to receive administrative relief served to put the government on notice that plaintiff was not sleeping on its rights). Charging Kansas with unreasonable delay in this case would not "encourage or force early litigation between states." Here, Kansas had available a means to investigate a possible violation of the Compact through an investigation by the Compact Administration. Arkansas River Compact, Art. VIII-H. The Compact also provides that the Compact Administration may refer matters for arbitration. *Id.*, Art. VIII-D. Thus, Kansas had means available, short of litigation, to make a complaint, but failed to make use of those means. Although equitable defenses should not be applied to encourage or force early litigation between states, it is sound public policy to encourage a state to give early notice of and an opportunity to remedy possible compact violations to a sister state, rather than sitting back silently while damages accrue.

The Master also suggested that Kansas' delay should be excused, at least for some period of time, because determining what flows are usable, and depletions to usable Stateline flows, in contrast to depletions to the total Stateline flows, is not simple. Report at 161, 162-63. While Kansas may have been entitled to a reasonable period of time to conduct an investigation into the basis for its claim, that excuse does not justify Kansas' lengthy delay in this case. For example, the 1983-84 investigation conducted by Simons, Li & Associates, Inc., for the State of Kansas was completed in five months. Jt. Exh. 88 at 1.1.

Simons, Li did not hesitate to make a preliminary assessment of what flows were usable or to make a preliminary estimate of depletions to usable flows from post-compact well pumping in Colorado. *Id.* at 5.2 to 5.5. Thus, the difficulty in determining what flows are usable, and depletions to usable Stateline flows, does not justify Kansas' lengthy delay in this case. *See Stone v. Williams*, 873 F.2d at 625 ("But these reasons for delay cannot last forever for the purposes of laches. A point arrives when a plaintiff must either assert her rights or lose them.").

3. Colorado Was Prejudiced by Kansas' Unexcused Delay

The final inquiry in the laches analysis is whether Colorado was prejudiced by Kansas' delay. Courts have recognized a variety of factors which constitute prejudice to the defendant from the plaintiff's delay.[39]

Evidentiary or "defense" prejudice may arise due to the loss of evidence, the death of witnesses, or the fading memories of other witnesses, thereby undermining the court's ability to determine the facts. *Brown v. County of Buena Vista*, 95 U.S. at 161; *Aukerman*, 960 F.2d at 1033; *Stone v. Williams*, 873 F.2d at 625-26; *Studiengesellschaft*

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[39] Federal Courts have generally applied a sliding scale on the issue of prejudice. *E.g., White v. Daniel*, 909 F.2d at 102; *Goodman v. McDonnell Douglas Corp.*, 606 F.2d at 807. The shorter the delay, the greater the prejudice the defendant must show and vice versa. *Id.* Obviously, the longer the delay, the greater the likelihood that witnesses have died, memories have faded, and evidence has been lost or obscured, which is certainly true in this case.

Kohle, 616 F.2d at 1326-27; *Goodman v. McDonnell Douglas Corp.*, 606 F.2d at 808 n. 17. *See Indiana v. Kentucky*, 136 U.S. 479, 511 (1890), *quoting Rhode Island v. Massachusetts*, 45 U.S. (4 How.) 591, 639 (1846).

Economic prejudice may arise where the defendant will suffer the loss of monetary investments or incur damages which likely would have been prevented by earlier suit. *Aukerman*, 960 F.2d at 1033. In other cases prejudice may arise because a defendant has changed its position in a manner that would not have occurred but for the plaintiff's delay. *Gull Airborne Instruments, Inc. v. Weinberger*, 694 F.2d at 844.

The Master acknowledged that there were problems with missing data in trying to reconstruct pumping in Colorado. Report at 157, 189, 202. Nevertheless, he concluded that Colorado had not suffered prejudice by Kansas' delay because data from the pre-compact or early post-compact years "was simply not being collected at that time." *Id.* at 157. He states: "The lack of data suggests that neither state could be expected to have been aware of the effect of pumping." *Id.* Further, he found that the comprehensive evaluation of the hydrology of the Arkansas River Valley in Colorado by the USGS in 1963-68 "used and collected all the data then reasonably available." *Id.* at 158. He states: "If Colorado has suffered any prejudice because of data missing prior to 1963, it is not because Kansas failed to complain about pumping, but simply because the data were not kept." *Id.* Colorado takes exception to these findings.

a. Evidentiary Prejudice

First, Colorado established that electric power records for the period 1940-63 were missing. Colo. Exh. 165*, Table 2.2; RT Vol. 69 at 107-08 (Slattery). The fact that data concerning pumping was not being collected does not mean that electric power records could not have been obtained if Kansas had made a timely complaint. The USGS did collect some power records during the 1963-68 investigation, but there is simply no way to know if the USGS "used and collected all the data then reasonably available" to estimate pumping for the period 1940-63. The electric power records or other data used to make those estimates were not published by the USGS, the data collected during the study to make those estimates was not preserved, and the man who made the USGS estimates for those years, R. Theodore Hurr, had died and was not available to explain the basis on which he had made those estimates. Report at 187; RT Vol. 71 at 51-53 (Slattery); RT Vol. 126 at 58 (Book); RT Vol. 130 at 48-49 (Simpson). In fact, there is no evidence that the USGS pumping estimates for the 1940s were based on power records at all or that the USGS collected any power records for that period. RT Vol. 130 at 49, 51-52 (Simpson).[40]

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[40] To estimate pumping in the CENTEL (Southern Colorado Power Company) service area prior to 1959 and in the Southeast Colorado Power Association (SECPA) service area prior to 1953, Kansas relied upon a tabulation of power company records prepared by the USGS. Colo. Exh. 660 at 4, 9. This tabulation went back to 1948 for the Pueblo Office of the Southern Colorado Power Company and for the Southeast Colorado Power Association; but, it is not clear when the USGS tabulation was

The main focus of the USGS investigation was to inventory wells, map the valley-fill deposits, measure water levels, and read power meters to develop detailed estimates of pumping for the period 1964-68. Jt. Exh. 66 at 4 ("Since 1964, most of the electric and gas meters on irrigation wells have been read during the spring and fall measurements; these readings provide the major source of data to compute ground-water withdrawal."). There is no indication in the 1970 USGS report that the estimates of ground water withdrawals before 1964 were significant for the purposes of that investigation. *See* RT Vol. 130 at 48-49 (Simpson). Nor is there any report on how those estimates were made. RT Vol. 71 at 51-52 (Slattery). Had Kansas complained in a timely manner in 1956, Colorado could have begun the cooperative investigation with the USGS before 1963 and could have attempted to collect missing power data for the years 1940-63. Further, had Kansas complained in 1968, the data used by the USGS to estimate pumping for the years 1940-63 would have been available, and Mr. Hurr would have been available to explain the data and assumptions he had used to make those estimates. Thus, the Master is simply wrong in finding that Colorado did not suffer prejudice because Kansas failed to complain.

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prepared. Colorado used identical power data for these two utilities to make estimates for those years; but, Colorado also obtained power data from Colorado State University, which had collected power data from the Southern Colorado Power Company that went back to 1932 and from the SECPA that went back to 1946. *See infra* note 53. Moreover, both Colorado and Kansas obtained power records from other utilities.

The Master acknowledged that electric power records were missing for the period 1940-60, but suggested that the prejudice to Colorado was not substantial because the missing records could be estimated by regression analyses. Report at 157. That was true to an extent; but, the Master concluded that the regression analyses which Colorado's experts made to estimate missing electric power records for the 1940-45 period were not reliable because they were based on a single set of data for the Pueblo Office of the Southern Colorado Power Company. *Id.* at 189-90. Further, the Master rejected Colorado's estimates for 1946-49, which included power records that were estimated by regression analyses, in part because the power records used to make those estimates were incomplete and might be inaccurate. *Id.* at 188-89, 199-200. Thus, it is totally inconsistent for the Master to say that the prejudice to Colorado from missing electric power records was not substantial when he rejected Colorado's estimates of pumping for the 1940s because there was insufficient data to support them. *Id.* This was not an insignificant issue. In the Report, he states that the amount of the pre-compact pumping allowance was the largest quantitative issue in the case. *Id.* at 182. Thus, Colorado suffered substantial prejudice from Kansas' delay.[41]

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[41] The Master suggests that there is some merit to Kansas' contention that the Colorado experts did not make any serious complaint about the lack of pre-1965 data. Report at 157. In fact, Mr. Slattery testified that the Colorado estimates before 1960 were more uncertain than the estimates after 1960 because of the lack of data. RT Vol. 69 at 93-94. Moreover, while Mr. Helton testified that Mr. Slattery's estimates of pre-compact pumping

In addition to missing electric power records, there was very little information available on pumping by wells powered by non-electric sources, except for the USGS investigation covering the years 1964-68. Report at 211. There is simply no information on what data the USGS collected, if any, to estimate pumping by non-electric powered wells before 1964, and Mr. Hurr had died and was unavailable to explain the assumptions he had made to make his estimates.

The Master also states that it is highly speculative to assume that Colorado would have been able to collect additional data if Kansas had complained sooner. Report at 158. This finding is totally unsupported by the record. First, the USGS investigation during the period 1963-68 was a cooperative investigation with Colorado agencies, Jt. Exh. 66 at 1, which was undertaken without any complaint by Kansas. Had Kansas complained in 1956, that cooperative investigation could have begun earlier. Second, very complete power records were available from 1975 forward, Colo. Exh. 660 at 3-4; RT Vols. 22 at 78-79; 126 at 10-11 (Book), which demonstrates, as one would

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were reasonable, RT Vol. 115 at 58, he also testified that Kansas' estimates of pre-compact pumping were "grossly unfair" to Colorado and not at all representative of what a reasonable level of use would be from those wells. *Id.* The differences between the Colorado and the Kansas pre-compact estimates were almost entirely due to lack of data; and, the Master rejected Colorado's estimates because of lack of data. Thus, while the Colorado experts may not have made a serious complaint about the lack of pre-1965 data per se, they made it clear that the estimates before 1960 were more uncertain and that the uncertainty was due to lack of data.

expect, that power records were much more complete the closer one got to the date of Kansas' complaint.[42]

In addition, had Kansas complained in 1956, farmers or other knowledgeable persons could have been called to testify about non-electric power usage and pumping in the 1940s and 1950s, as Mr. Miles and Mr. Longenbaugh were able to do for the 1970s. Report at 213-14. Likewise, information on conversion from centrifugal pumps and the efficiencies of centrifugal pumps used in the 1940s and 1950s could have been obtained.

Further, there was missing data to estimate pumping after 1968, when the USGS study ended. Specifically, there was only limited data on power conversion coefficients and well-by-well pumping. Report at 215-18; RT Vol. 22 at 50-51 (Book). Had Kansas complained at that time, Colorado could have continued the reading of power meters to estimate pumping and made additional measurements of power coefficients.

The Master rejects this argument and states that he doubts that complaints by Kansas realistically would have made any difference in Colorado's data collection system. Report at 148. He based this conclusion on the fact that "nothing substantial was done" in response to recommendations in the Wheeler Report in 1968 to obtain accurate and continuous discharge records of major tributary inflow and to install meters on wells. *Id.* This statement is inaccurate and unfair. The Purgatoire River and the Apishipa River have been gaged throughout the post-

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[42] Even these records for the most part are not well-by-well power records. RT Vol. 22 at 50-51 (Book).

compact period. Colo. Exhs. 835 and 836. Streamflow gages were established or reestablished on Fountain Creek at Pueblo, the St. Charles River, the Huerfano River, and Big Sandy Creek after 1968. Colo. Exh. 2, Table 2.2.1 at 2-19 (Fountain Creek at Pueblo, 1971-1985); at 2-20 (St. Charles near Vineland, CO, 1968-1974; St. Charles at Vineland, CO, 1978-1985); at 2-21 (Huerfano River near Boone, 1979-85); at 2-25 (Big Sandy Creek near Lamar, 1968-1982). These are the *major* tributaries below Pueblo and streamflow gages were installed on these, as well as other tributaries. *Id.*

Admittedly, the Colorado State Engineer did not order well owners to install meters on wells, but Dr. Danielson and Mr. Simpson explained why they felt that ordering farmers to install meters in wells was not feasible. Report at 113 note 43. While Colorado could have continued the cooperative investigation with the USGS to read power meters, that study was very expensive, RT Vol. 129 at 28 (Major), and there were no complaints by Kansas to justify continuation of that program.

Moreover, missing evidence to estimate pumping was not the only evidentiary prejudice suffered by Colorado from Kansas' delay. Important witnesses who could have established Kansas' knowledge of increased well pumping and post-compact well development in Colorado in 1956 had died, including William E. Leavitt, Roland H. Tate, and Robert V. Smrha. Report at 158-59.[43] The Master states that the testimony of these men would

[43] Tate died in 1964. Leavitt died in 1967. Smrha died sometime after he retired in 1972. Report at 159.

not have been useful because the records of the Compact Administration are completely devoid of any references to well pumping in Colorado during this time period. *Id.* at 159. In fact, there was "considerable discussion concerning well drilling and its effects on conditions" at the annual meeting of the Compact Administration in December, 1956. Thus, their testimony would have been highly useful to establish their knowledge of post-compact well pumping in Colorado and the reasons Kansas did not make a complaint or request an investigation at that time.

In addition, Colorado established that the streamflow gage at Garden City had been converted to a gage to record flood flows in 1970. Report at 300. The flow at Garden City was needed to do an analysis of flows that had passed Garden City unused. *Id.* at 296. It is unlikely that Colorado would have agreed to the conversion of the Garden City gage had Kansas given any indication that Colorado might be sued for a Compact violation at that time.[44] In addition, had Kansas complained in 1968, it is unlikely that the Colorado State Engineer would have continued to issue well permits after that date. *See* RT Vol. 76 at 109-15 (Danielson).

[44] The gaging station at Garden City was discontinued by mutual agreement of the States. Twenty-Second Annual Report of the Arkansas River Compact Administration at 7 (1970) (Jt. Exh. 18).

b. Economic Prejudice

With regard to economic prejudice, the Master found that Colorado had not been prejudiced by Kansas' delay because once farmers in Colorado, relying upon Colorado law, had made investments to replace pumps and construct wells, the passage of time would not create prejudice. Report at 157. On the contrary, he concluded that delay by Colorado or Kansas in bringing about well regulation permitted the benefits of those wells to be increasingly enjoyed and such investments amortized. *Id.* This analysis confuses benefits of wells to well owners with prejudice to Colorado.[45] While well owners may have enjoyed benefits from post-compact well pumping, the Special Master recommends that Colorado should now pay damages for depletions to usable Stateline flows since 1950 when Kansas made no complaint about such pumping for 29 years. To the extent well owners in Colorado made substantial investments during that period and damages increased while Kansas delayed in complaining about post-compact well development, Colorado was prejudiced by Kansas' delay. *See Colorado v. Kansas*, 320 U.S. at 394; *Continental Coatings Corp. v. Metco, Inc.*, 464 F.2d 1375, 1378 (7th Cir. 1972).

Thus, Colorado demonstrated that important evidence was missing, that important witnesses had died,

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[45] It also ignores the fact that, as Mr. Miles testified, farmers made changes in their operations to incorporate the use of wells, which would make it difficult to convert back to the use of surface water only. RT Vol. 66 at 44-46. *See* Report at 217 (noting Miles' testimony that many systems changed over to underground pipelines).

that there were actions Colorado could have taken to obtain evidence had Kansas complained earlier, and that Colorado had changed its position because Kansas had not complained. Moreover, well owners in Colorado made substantial investments to replace centrifugal pumps, to construct wells, and to change their methods of operation while Kansas unexcusably delayed in making its claim. Report at 149, 217. This evidence was certainly sufficient to establish prejudice.

In summary, the evidence clearly and convincingly shows that 1) Kansas delayed for a lengthy period of time – at least 16 years, or 29 years if Colorado is correct – in making its well claim; 2) there was no valid excuse for Kansas' delay; and 3) Colorado was prejudiced by Kansas' unexcused delay. Thus, Colorado established the basis for its defense of laches.

4. Laches Should Bar a Claim for Damages until Kansas Made a Request for an Investigation in 1985

Application of laches to Kansas' well claim would not affect the prospective enforceability of the Compact, but Kansas' unreasonable and unexcused delay should bar a claim for damages prior to March 1985, when Kansas asked the Compact Administration to conduct an investigation. *Aukerman*, 960 F.2d at 1031; *A.C. Aukerman v. Miller Formless Co.*, 693 F.2d 687, 699 (7th Cir. 1982); *Univ. of Pittsburgh v. Champion Prod., Inc.*, 686 F.2d 1040, 1044 (3d.Cir.), *cert. denied*, 459 U.S. 1087 (1982). Moreover, application of laches would also eliminate the difficult

problems, largely caused by Kansas' delay, in trying to reconstruct pumping back to 1950.

II. ARTICLE IV-D OF THE ARKANSAS RIVER COMPACT DOES NOT LIMIT PRE-COMPACT WELLS IN COLORADO TO PUMPING 15,000 ACRE-FEET PER YEAR AFTER THE COMPACT BECAME EFFECTIVE

The most significant factual issue in this case was the amount pre-compact wells in Colorado were entitled to pump after the Compact became effective. As the Special Master states:

> Both Kansas and Colorado acknowledge that some wells were in existence during the precompact years, and that pumping of groundwater did occur. Both states also agree that a certain amount of pumping should thus be allowable under the compact. However, the states are in major disagreement over the extent of this allowance. In fact, in terms of potential impact on Stateline flows, the amount of so-called "precompact" pumping is the largest quantitative issue in the case.

Report at 182.

Kansas estimated that ground water pumping in Colorado between Pueblo and the Stateline was 11,000 acre-feet in 1948. Report at 182. Kansas contended that this was the amount of pumping thus "grandfathered" under

the Compact and all that pre-compact wells were allowed to pump in post-compact years. *Id.*[46]

In contrast, Colorado assumed that wells with pre-compact dates of appropriation were entitled to pump the amounts they had pumped under Colorado law, which varied from year-to-year, but averaged 49,275 acre-feet during the period 1950-1985. Report at 183.

The Master rejected both Kansas and Colorado's assumptions about the amount that well owners with pre-compact wells were entitled to pump after the Compact became effective, and instead recommends that pre-compact wells should be limited to pumping the highest amount pumped during the years the Compact was negotiated, which he found to be 15,000 acre-feet per year. Report at 186-88, 200. One reason he rejected Colorado's theory of entitlement was that many well owners in Colorado had replaced centrifugal pumps with more efficient turbine pumps in the early 1950s, which allowed them to pump more water than they had pumped before the Compact became effective. *Id.* at 189. The Master concluded that the increased pumping was "improved or prolonged functioning of existing works" under Article IV-D of the Compact and, therefore, a future beneficial development subject to the limitations of Article IV-D of

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[46] Kansas made no estimates of ground water pumping in Colorado before 1948. RT Vol. 126 at 55-56 (Book). Moreover, Kansas' estimate for 1948 was based on incomplete power records and assumed that pumping by non-electric wells was the same percentage in 1948 as in 1964 when the USGS did an extensive inventory of wells in Colorado. *See infra* notes 48 and 52.

the Compact. *Id.* at 194. Colorado takes exception to this ruling.

A. PRE-COMPACT WELLS ARE NOT LIMITED TO PUMPING THE HIGHEST AMOUNT PUMPED IN THE YEARS DURING WHICH THE COMPACT WAS NEGOTIATED

In interpreting Article IV-D of the Compact, the Master relied on what he believed the Compact negotiators had intended and ignored the subsequent practice of the parties to the Compact.[47] For at least 36 years after the

[47] The Master generally relied for his interpretation of the Compact on the Kansas historian, Dr. Douglas Littlefield, who prepared a two-volume history of the Arkansas River Compact and testified at length at trial. Report at 71-73. In his report, Dr. Littlefield repeatedly asserted the thesis that the Compact was intended to preserve the status quo in relation to existing diversions in Kansas and Colorado. *E.g.*, Kan. Exh. 129 at 6-8, 263, 296-97, 349-50, 380, 387, 392, 440, 459-60. Colorado objected to portions of Dr. Littlefield's testimony and his report on the grounds that they contained inadmissible legal conclusions about the meaning of the Compact and the intent of the Compact Commissioners, and the Master did grant Colorado's motion to strike portions of the testimony and report. Report at 73; Order (Nov. 13, 1993). However, the Master generally adopted Dr. Littlefield's thesis as his own. Report at 73, 89-90.

Colorado has several objections to Dr. Littlefield and the Master's interpretation of the Compact. First, Dr. Littlefield developed his thesis in large part on the basis of the "broader historical context within which the need for a compact arose." Kan. Exh. 129 at 10-11. Dr. Littlefield's approach reflects the difference between methods used by historians and methods used by Courts to interpret a compact. *See* Kan. Exh. 129 at 11-15. For example, during cross-examination it was brought out that Dr. Littlefield had not relied on anything after the

Compact became effective, Kansas made no objection to the replacement of centrifugal pumps with turbine pumps or increased pumping by pre-compact wells which resulted from improved pumps, drier climatic conditions, or other factors. Not once before this litigation did Kansas suggest that pumping by pre-compact wells in Colorado was limited to the amount pumped during the pre-compact period. Nor did Kansas prevent replacement of centrifugal pumps by turbine pumps or limit pumping by pre-compact wells in Kansas to the amount pumped during the pre-compact period. Jt. Exh. 105 at 40; Report at 226. It is not proper to ignore the subsequent

Compact was signed, including General Kramer's report to Congress, the hearings held by Congress, or the reports by the Commissioners. RT Vol. 9 at 114-15. Further, he had relied "to a substantial degree" on unedited, uncertified transcripts of the Compact negotiations that were discovered in General Kramer's files rather than the official record of the meetings which the Commissioners had prepared and approved. *Id.* at 115, 120-24, 126-30. *See also* Kan. Exh. 129 at 225, note 274. The Master adopted Dr. Littlefield's approach in interpreting the Compact, Report at 71-90, relying heavily on "the rich history of controversy over the river, and early efforts to apportion its waters between the two states," Report at 71, to derive certain principles which he then used to interpret the Compact. *Id.* at 89-90. He also relied on the unedited, uncertified transcripts of the Compact negotiations (Jt. Exh. 4). *Id.* at 92, 93, 96, 99, 100, 103. The result is that instead of determining the meaning of the Compact from the language of the Compact, the official record prepared by the Commissioners, the report to Congress by General Kramer, the reports by Commissioners, and the subsequent practice of the parties, Dr. Littlefield and the Master tried to divine what they thought the Commissioners had intended from the background leading to the adoption of the Compact.

practice of the parties in interpreting an interstate compact. *See* Restatement (Third) of the Foreign Relations Law of the United States § 325(2) (1987) (subsequent practice is relevant to the interpretation of international agreements); Restatement (Second) of Contract § 202 and comment g (1981) ("The parties to an agreement know best what they meant, and their action under it is often the strongest evidence of their meaning.").

Furthermore, Article VI-A(2) of the Compact provides:

> Except as otherwise provided, nothing in this Compact shall be construed as supplanting the administration by Colorado of the rights of appropriators of waters of the Arkansas River in said State as decreed to said appropriators by the courts of Colorado, nor as interfering with the distribution among said appropriators by Colorado, nor as curtailing the diversion and use for irrigation and other beneficial purposes in Colorado of the waters of the Arkansas River.

The Colorado Commissioners in their report on the Compact stated that Article VI "fully recognizes Colorado's statutory system of water administration, particularly as to use for irrigation and other beneficial purposes in Colorado." Report and Submission by the Commissioners for Colorado of the Arkansas River Compact, *reprinted in Senate Hearing, supra* note 2, at 26 (Article VI) (Jt. Exh. 15); *House Hearing, supra* note 2, at 20 (Article VI) (Jt. Exh. 16). This report was submitted to Congress for consideration in connection with approval of the Compact, *Senate Hearing, supra* note 2, at 21-27 (Jt. Exh. 15); *House Hearing, supra* note 2, at 15-21 (Jt. Exh. 16),

and the Kansas Commissioners did not disagree with the interpretation of Article VI by the Colorado Commissioners. The Master states that Article VI-A(2) must be read in conjunction with Article IV-D and "was not meant to override the obligations of Colorado under Article IV-D." Report at 193-94. However, nothing in Article IV-D states that pre-compact wells in Colorado are limited to pumping the amounts that were pumped during the pre-compact period. This is a limitation which the Master has read into Article IV-D based on his assumption about what the Compact Commissioners intended, an assumption which is not supported by the wording of Article IV-D, the report of the Colorado Commissioners, or the subsequent practice of the parties.

Moreover, the Master's interpretation of the Compact is contrary to the provisions of the Compact when considered as a whole. Article V-H of the Compact provides that "the ditch diversion *rights*" from the Arkansas River in Colorado Water District 67 and in Kansas between the Stateline and Garden City "shall not hereafter be increased beyond the total present *rights* of said ditches" without the Compact Administration making findings that no material depletion of usable flows will result from such increase. Arkansas River Compact, Art. V-H. (emphasis added). The term "rights" is significant in this context. The Compact Commissioners understood that the operation of John Martin Reservoir would change the regime of the river, Jt. Exh. 5 at 2-3, and that diversions by ditches in Water District 67 and in Kansas might increase as the result of implementation of the Compact. *House Hearing, supra* note 2, at 32 (Statement of George S. Knapp) (Jt. Exh. 16). Increases in the *amounts* diverted by

these ditches were not prohibited by the Compact so long as their ditch diversion *rights* were not increased without a finding of no material depletion of usable flows. Thus, it is consistent with Article V-H to permit amounts diverted by pre-compact wells to increase so long as their *rights* are not increased. And, in fact, that was how wells in Colorado were administered without complaint by Kansas for 36 years.

The Master rejected this argument because he concluded, based on Article V-H of the Compact, that: "I cannot believe that the compact was intended to limit increased diversion rights, but to allow new rights to be later established for wells that would change the river allocation between the states." Report at 194. The Master's response is wrong on two counts. First, rights for pre-compact wells in Colorado may have been *decreed* after the Compact became effective, but those rights were *established* by appropriation prior to the date the Compact became effective. *Black v. Taylor*, 128 Colo. 449, 264 P.2d 502, 506-07 (1953); *see Colorado v. New Mexico*, 459 U.S. 176, 179 n. 4 (1982) (describing the prior appropriation doctrine). Ditch diversion rights in Colorado are based on rates of flow in cubic feet per second of time. Because weather conditions vary substantially from year to year in Colorado, diversions are not limited to a specific volume of water, but by the needs of the land for which the right was appropriated. *City of Colorado Springs v. Bender*, 148 Colo. 458, 366 P.2d 552, 555 (1961); RT Vol. 84 at 21 (Helton). Therefore, as witnesses for both states testified, the amount of water pumped by wells will vary in any particular year depending on the crops grown, hydrologic conditions, economic factors, and, in the case of

wells used as a supplemental source of supply, the amount of surface water available. RT Vol. 22 at 61, 81-82, 83-84 (Book); RT Vol. 130 at 42-46 (Simpson); RT Vols. 84 at 19-21; 134 at 78-82, 96, 99 (Helton).

The Compact Commissioners clearly understood that ditch diversions in both states, measured in acre-feet, vary from year to year. Jt. Exh. 5 at 2-3, 22. This was permitted so long as the diversion *rights* of the ditches were not increased. Thus, in the case of rights to divert ground water, it is consistent with Article V-H to hold that the Compact did not prevent increased diversions by wells as long as their rights were not increased. And, for many years, the parties acted in accordance with this understanding. The Colorado State Engineer did not limit diversions by pre-compact wells to the volume of ground water pumped during the period when the Compact was negotiated, and Kansas never suggested that pumping by pre-compact wells must be so limited.

The Master disagreed with Colorado about what the Kansas Commissioners who negotiated the Compact understood because he "[did] not believe that any of the commissioners, either from Colorado or Kansas, had in mind the development of the deep turbine pump or the possibility of such a dramatic increase in pumping." Report at 194-95.

Colorado does not dispute that some portion of the increase in pumping by pre-compact wells was due to the replacement of centrifugal pumps with more efficient turbine pumps. However, this occurred in both states without objection. Jt. Exh. 105 at 40; Kan. Exhs. 447 at 112 (all but four of the irrigation wells in Finney and Gray

Counties, Kansas, were equipped with centrifugal pumps); 448 at 92-93 (most irrigation wells in the Arkansas Valley in Hamilton and Kearny Counties, Kansas, were equipped with centrifugal pumps). Given the lack of data to estimate pumping in the 1940s, Report at 199, and the fact that Kansas did not complain at the time about such a conversion or increases in pumping, Colorado believes that owners of pre-compact wells should be permitted to pump in accordance with Colorado law, in amounts which vary from year to year depending on hydrologic conditions and other factors, as they had for the 36 years before Kansas filed this lawsuit. Moreover, not only is this interpretation of the Compact supported by the long-standing conduct of the parties, it is necessary to avoid prejudice to Colorado from Kansas' delay in complaining about well pumping. As will be clear from the discussion of the evidence that follows, Kansas' delay has made it virtually impossible to reconstruct the historical record of pre-compact well pumping.

But, even if the increased pumping due to turbine pumps is "improved or prolonged functioning of existing works" for the purposes of Article IV-D of the Compact, Colorado presented a reasonable method to factor out the increased pumping due to turbine pumps based on the average amounts pumped per well during the 1940s, using estimates made by Colorado's experts. Report at 195-96. The Master rejected Colorado's method on the basis that Article IV-D did not permit *any* increased pumping after the Compact became effective. *Id.* at 194-95. He also rejected the pumping estimates made by Colorado's experts and accepted the pumping estimates made by the USGS as a basis to estimate the pre-compact

pumping allowance. *Id.* at 199-200. Colorado takes exception to this ruling.

B. THE USGS ESTIMATES FOR THE 1940S ARE NOT SUPPORTED BY POWER DATA AND THE MASTER'S REASONS FOR ACCEPTING THOSE ESTIMATES ARE NOT REASONABLE

Colorado made estimates of pumping during the 1940s, which averaged 25,228 acre-feet per year. Report at 185. In 1940, a very dry year, Colorado estimated that ground water pumping in Colorado was 36,837 acre-feet. Colo. Exh. 165*, Table A.1. In 1948, a very wet year, Colorado estimated that ground water pumping was 24,475 acre-feet. *Id.*[48]

The Master rejected the estimates by Colorado's experts for the 1940s on the grounds that "[p]rior to the trial of this case, pumping for 1940-49 had been estimated in five separate hydrologic reports," and "[n]one of these reports, however, estimated amounts that approached the yearly average of 25,228 acre-feet submitted by Colorado for use in the trial." Report at 185. All five reports use

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[48] Both Kansas and Colorado started with the same power records to estimate pumping in Colorado in 1948. There were several reasons for the difference in the Kansas and Colorado pumping estimates for 1948 (11,000 acre-feet vs. 24,475 acre-feet), but the two main reasons are that Colorado estimated missing electrical power records in the Las Animas service area and assumed a higher percentage of pumping by non-electric wells than did Kansas. RT Vol. 133 at 39 (Helton). As Mr. Helton testified, the failure to estimate pumping in the Las Animas service area was not reasonable because there were a significant number of pre-compact wells in that area. *Id.* at 41.

estimates made by the USGS.[49] The USGS estimates were made by Mr. R. Theodore Hurr and have been used in various reports, but the data used by Mr. Hurr to make the estimates for the 1940s were not available, no one was sure how the estimates were reached, and Mr. Hurr died before he could be questioned about the basis on which he made his estimates. Report at 187; RT Vol. 130 at 47-49, 51-52 (Simpson). Although testimony exposed inconsistencies between the USGS pumping estimates and power records, Report at 187; RT Vol. 130 at 47-52 (Simpson), the Master accepted the USGS estimates. We address the Master's reasons for accepting those estimates.

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[49] The estimates in the 1970 USGS report are simply shown in the form of a bar chart. Jt. Exh. 66 at 8, Fig. 3. There are no numerical values given in the report for the 1940-49 ground water withdrawals and there is no explanation of how those estimates were made. The 1985 USGS report and 1986 USDA report simply republished the bar chart from the 1970 Report. Jt. Exh. 129 at 10; Jt. Exh. 108 at I-11. The 1968 Wheeler Report and the 1975 report contain numerical estimates of pumping. Jt. Exh. 92 at 22; Jt. Exh. 94 at 22. The pumping estimates in the 1968 Wheeler Report were obtained from the USGS. Jt. Exh. 91 at 9 (Volume 1 of the Wheeler Report). The 1975 report states that the data for 1940-62 is from the 1970 USGS report. Thus, all five reports use estimates by the USGS, and the estimates in four of the five reports are identical. The fifth report, the Wheeler Report, has slightly different estimates for some years between 1940 and 1965 (*e.g.*, 2,300 acre-feet for 1940 vs. 2,500 acre-feet for 1940 in the 1975 report), but those estimates came from the USGS, Jt. Exh. 91 at 9, and appear to be a preliminary version of the estimates published in the 1970 USGS report.

1. Experts Relied on the 1970 USGS Report

The Master states that experts for both states relied heavily on the 1970 USGS report in which the 15,000 acre-foot estimates appear. Report at 186. This misconstrues the reliance by the experts on the 1970 USGS report.

Experts for both states relied on the power coefficients measured by the USGS during the 1964-68 field investigation and the information on the type of power used for pumping contained in the 1970 USGS report. However, experts for neither state relied on the USGS pumping estimates for the period 1940-63 in the report. RT Vol. 69 at 95-97 (Slattery) (USGS procedure to estimate pumpage prior to 1964 is not documented and is not reasonable); RT Vol. 126 at 30 (Book) (did not form an opinion about the USGS estimates; completed his analysis based on power sold by the power companies for irrigation use). Thus, the fact that experts for both states relied on other portions of the 1970 USGS report is not a reasonable basis to rely on the pumping estimates for the 1940s in that report.

2. Major's Defense of the USGS Estimates

The Master states that Colorado called one of the authors of the 1970 USGS Report as a witness, and he "staunchly defended the accuracy of the USGS's pumping estimates." Report at 186-87. That is not a reasonable basis to accept the USGS pumping estimates. The witness, Mr. Thomas J. Major, was responsible for the inventory of

large-capacity wells from Pueblo to Swink[50] and the collection of data for the report. RT Vol. 129 at 13-14, 17. He was not qualified as an expert on pumping estimates (or otherwise) and had no involvement in making the pumping estimates in the USGS report, other than to provide information to Mr. Hurr. *Id.* at 19, 28, 56. He did not know how the ground water withdrawals plotted in Figure 3 of the 1970 USGS report were determined. *Id.* at 28. Mr. Major was asked specifically if he had determined the amounts of pumping:

> THE SPECIAL MASTER: DID YOU DETERMINE ANY AMOUNTS OF PUMPING?
>
> THE WITNESS: NO, SIR.
>
> BY MR. DRAPER:
>
> Q: AND YOU DON'T KNOW HOW THOSE DETERMINATIONS WERE MADE?
>
> A: THAT WAS TED HURR'S FUNCTION. MY RESPONSIBILITY WAS PRIMARILY TO GET THE INFORMATION TO HIM.

RT Vol. 129 at 56; *see also* RT Vol. 129 at 61-62, 63.

During cross-examination, Mr. Major was asked if he had any reason to doubt the pumping estimates in the 1970 USGS report. RT Vol. 129 at 61. Mr. Major responded that he did not develop them but had "no reason to believe that anyone would do anything that wouldn't be accurate." *Id.* at 62. The basis, and the only basis, for Mr. Major's defense of the accuracy of the USGS pumping

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[50] Swink, Colorado, is just west of La Junta, Colorado. RT Vol. 129 at 13. Thus, Mr. Major was responsible for the inventory of wells in the upstream reach of the study. *Id.* at 13, 15.

estimates was that those figures were subject to the normal USGS peer review and checking and he had no reason to doubt Mr. Hurr's work. *Id.* That is not a reasonable basis to accept Mr. Major's opinion. *See* Fed.R.Evid. 703. Mr. Major was not qualified as an expert in making pumping estimates, Fed.R.Evid. 702, and wasn't qualified to give an opinion that experts in making pumping estimates would reasonably rely upon pumping estimates made by Mr. Hurr. Moreover, Mr. Major did not know how those estimates had been made and did not know what data had been used by Mr. Hurr. RT Vol. 129 at 63. Thus, it is not reasonable to rely on his opinion as a basis to accept the USGS pumping estimates.

3. Fellhauer

The Master states that the Colorado Supreme Court in *Fellhauer v. People*, 167 Colo. 320, 447 P.2d 986, 991 (1968), stated that in 1940 only 2,000 acre-feet were being pumped from wells in the Arkansas Valley in contrast to the estimate of 36,837 acre-feet calculated by Colorado for this trial. Report at 187. The Colorado Supreme Court apparently relied on the USGS estimate for its statement. However, the amount of pumping in 1940 was not a fact which was necessary to the Court's determination in that case, and uncritical use of that estimate does not establish that it is reasonable.

4. 1975 Report

The Master states that Colorado also used the USGS data in its 1975 report prepared for the proceeding before

the water court and introduced into evidence. Report at 187. The Colorado State Engineer's Office did use the USGS pumping estimates for 1940-62 in its 1975 report, Jt. Exh. 94 at 22, Table 7, but also included electric power data in the report. *Id.* Dr. Danielson, who supervised the collection of data for the 1975 report, RT Vol. 76 at 87-88, testified that the USGS pumping estimates for the 1940s appeared to be suspicious based on the electric power data in the 1975 report, RT Vol. 77 at 9-10, and did not appear to be reasonable. RT Vol. 78 at 83-84, 118. Dr. Danielson also testified that the State Engineer's Office was under considerable time pressure to complete the 1975 Report for use at trial and generally used whatever data was available without further analysis. RT Vol. 76 at 94-96. Thus, the mere fact that the USGS pumping estimates were used in the 1975 report does not establish that those estimates are reasonable. *See* RT Vol. 78 at 86, 118.

5. Book's Testimony

The Master states that from the Kansas viewpoint, its expert testified that while he thought the 15,000 acre-foot figure estimated by the USGS for 1948 was high, it was nonetheless reasonable. Report at 187.[51] However, the Kansas expert, Mr. Book, assumed that the percentage pumped by non-electric powered wells in Colorado did not increase prior to 1964, even though 1940 census data (Colo. Exh. 115 at 209) and a Bureau of Reclamation study in 1943 and 1944 on a portion of the Bessemer Terrace

[51] In contrast, Colorado estimated that pumping in 1948 was 24,475 acre-feet. Colo. Exh. 165*, Table A.1.

(Colo. Exh. 114) showed a much higher percentage of wells powered by non-electric sources. RT Vol. 126 at 43-44, 51-55 (Book); Colo. Exh. 165*, Table 7.1.[52] He also made no attempt to estimate missing power records in the Las Animas, Lamar, and Holly service areas when he estimated pumping for 1948. RT Vol. 24 at 7; *see* RT Vol. 69 at 110-12 (Slattery) (Kansas did not estimate missing data for the Las Animas service area which is not reasonable.); Kan. Exh. 689 at 4 (memo prepared by Mr. Book stating that Colorado's estimates for the Lamar and Las Animas Power Company service areas were an additional significant reason for differences in the estimates in early years). Thus, the difference between the Kansas and Colorado estimates of pumping in 1948 (11,000 acre-feet vs. 24,475 acre-feet) results primarily from differences in assumptions about missing data, RT Vol. 126 at 54-57 (Book), data which could have been obtained or estimated with more accuracy if Kansas had complained earlier. Furthermore, Mr. Book did not make estimates for

[52] For example, in the CENTEL (Southeast Colorado Power Company) service area and the western portion of the SECPA service area, Mr. Book calculated non-electric pumping as three percent of the total pumping, limited to a total of 2,200 acre-feet based on the maximum non-electric pumping estimated by the USGS during the 1964-68 study. RT Vol. 22 at 75 (Book). Mr. Book admitted that he had no information on non-electric pumping in those areas prior to 1964. RT Vol. 23 at 115. Census data in 1940 reported 344 wells in the Arkansas River Valley, of which only 100 were electric wells. Colo. Exh. 165*, Table 7.1. The inventory of wells by the Bureau of Reclamation in 1943 and 1944 on the portion of the Bessemer Terrace, which was in the Southeast Colorado Power Company service area, indicated that 44 wells were powered by gas and 87 were powered by electric pumps. *Id.*

years prior to 1948 and did not rely on the USGS estimates in making the Kansas estimates. RT Vol. 126 at 30.

6. Basis for the Colorado Estimates

The Master states that even though cross-examination of Mr. Book did expose some inconsistencies between the USGS pumping estimates and the power data in Table 7 of the report prepared by the Colorado State Engineer's Office, Report at 187, "the evidence is without dispute that the published power records for this early period were incomplete, and it may well be that it is the power data on Table 7 not the pumping estimates that are inaccurate." *Id.* at 188.

First, there is no way to know if the USGS pumping estimates are accurate because there is no data to support those estimates and the person who made them is dead. Second, no one knew exactly where the power data in Table 7 came from, Report at 187, RT Vol. 126 at 58; but the power data used by Colorado's experts for the period 1940-49 was obtained from Colorado State University (CSU), which had collected the data from the power companies. RT Vol. 69 at 102; Colo. Exh. 88.b.[53] Cross-

[53] From 1957 to 1974, CSU collected data from utilities throughout the State of Colorado on power sold for irrigation use. RT Vol. 69 at 99-102 (Slattery). It collected some data in the Arkansas River Valley which goes back as far as 1932. Colorado used the data collected by CSU to make pumping estimates for the years 1940-74, when available, supplemented by records of the Public Utilities Commission, when those were available. Colo. Exh. 165*, Table 2.2 (summary of process used to estimate missing power records for basin). Kansas used virtually identical power data for the years 1948-59 based on a tabulation of

examination of Mr. Book also showed that the USGS estimates for the 1940s were inconsistent with the power data collected by CSU. RT Vol. 126 at 64-66. Mr. Hal D. Simpson, the Colorado State Engineer, testified that the USGS estimates for the 1940s were not consistent with the power data obtained by CSU and were not consistent with studies by the Bureau of Reclamation in 1943 and 1944 because they do not reflect any variation due to wet and dry years. RT Vol. 130 at 47-52 (Simpson). Moreover, there was testimony that the 1940s, with the exception of 1940, in general were a wet period and that surface diversions in Colorado were much above average which would have resulted in below average ground water use. RT Vol. 82 at 133 (Helton).

7. Virtually Nothing Is Known about the Power Figures, but the Pumpage Estimates Have Been Accepted

The Master states that virtually nothing is known about the power figures on Table 7 of Jt. Exh. 94, but the USGS pumping estimates have been accepted, published, and used by the State of Colorado, the courts, the U.S. Department of Agriculture, and the USGS as late as 1985. Report at 188. First of all, Colorado's experts used power data collected by CSU from the utilities, not the power figures on Table 7 of Jt. Exh. 94. Second, the USGS pumping estimates may have been accepted, published, and used by others, including the Colorado State Engineer's

power company records prepared by the USGS, except for years when it used ledger sheets to estimate power sold in the Southeast Colorado Power Association service area. Report at 207.

office, but those estimates are not supported by power data, no one knew how they were made, they are not reasonable, and they were not used by experts for either state to estimate pumping for the period 1950-63.[54]

8. Lack of Discussion of Pumping During the Compact Negotiations

In addition to the foregoing reasons for adopting the 15,000 acre-foot figure, the Master states that "[c]urrent well pumping in Colorado appears simply not to have been a matter of concern to the compact commissioners." Report at 101; *see also* Report at 195 ("Pumping at the time was so insignificant that it did not even enter the discussions."). He states: "Had pumping been of any appreciable magnitude, I cannot believe that such use of water would not have surfaced in the engineering committee report and the compact negotiations." *Id.* at 101.

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[54] The Master also states that, moreover, there was persuasive testimony by one of the authors of the 1970 USGS report as to the accuracy of that USGS publication. Report at 188. As pointed out, Mr. Major was not an expert in making pumping estimates, did not determine the pumping estimates in the USGS report, and did not know how they were made. Given those facts, his testimony is hardly persuasive. Likewise, the fact that the USGS estimates were made much closer to the time period involved and without the pressure of trial advocacy, Report at 200, does not suggest that the USGS estimates are likely to be more accurate than Colorado's estimates when there is no evidence that the USGS collected any power records earlier than 1948 or even used power records to make the estimates for the 1940s. RT Vol. 130 at 49, 51-52 (Simpson).

First, the Compact Commissioners clearly knew that there was well pumping in both states. *E.g.*, Kan. Exh. 205A at 2; Colo. Exh. 623 at 29-30; *Colorado v. Kansas*, 320 U.S. at 399 (describing testimony that farmers in Kansas who could be served by existing ditches had elected to install pumping systems because of lower costs). Moreover, reports published in 1943 and 1944 in Kansas estimated that ground water withdrawals for irrigation in the Arkansas River Valley in Hamilton, Kearny, and Finney Counties were approximately 50,100 acre-feet in 1939. Kan. Exh. 448 at 97-98 (23,000 acre-feet pumped in Hamilton and Kearny Counties); Kan. Exh. 447 at 118 (27,100 acre-feet pumped in the Arkansas River Valley in Finney County). Thus, the fact that pumping in Colorado was not discussed during the Compact negotiations does not suggest that pumping was insignificant or that Colorado's estimates are unreasonable.

Second, the engineering committee report specifically noted that the diversion records did not include amounts pumped by wells. *Id.* at 3 ("Irrigation supplies derived from pumps in both states are not included in the tabulated diversions."). The engineering committee never completed its studies. Colo. Exh. 57; RT Vol. 13 at 5-10 (Littlefield). Thus, the fact that the engineering committee report does not contain estimates of pumping and the absence of discussion of pumping during the Compact negotiations does not suggest that Colorado's estimates are unreasonable. If anything, the absence of discussion of pumping indicates that the Compact Commissioners assumed that rights of pre-compact well owners would

be administered in accordance with state law. Arkansas River Compact, Art. VI-A(2).[55]

9. Concerns With Colorado's Estimates

As the final reason for adopting the USGS estimates of pumping for the 1940s, the Master states that he has concerns about the higher pumping estimates developed by Colorado for the 1940-49 period. Report at 189. Basically, he concluded that there was considerable uncertainty in the estimates of pumping during the 1940s because of the lack of information and rejected Colorado's estimates because they were inconsistent with the USGS estimates, which had been used and accepted in other reports. Report at 189-90. This penalized Colorado for the fact that data was missing because of Kansas' delay in complaining. Because it was unreasonable to accept the USGS estimates of pumping for the 1940s, estimates for which there was no underlying data, Colorado recommends that the case be remanded to the Master to determine the amount pumped by pre-compact wells based on their Colorado rights or, in the alternative, the amount pumped prior to the Compact.

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[55] The Commissioners for Colorado who negotiated the Compact stated in their report to the Governor and the General Assembly on the proposed Compact that Article VI of the Compact "fully recognizes Colorado's statutory system of water administration, particularly as to use for irrigation and other beneficial purposes in Colorado." *Report and Submission by the Commissioners for Colorado of the Arkansas River Compact, reprinted in Senate Hearing, supra* note 2, at 26 (Article VI) (Jt. Exh. 15).

IV. INCREASES IN STATELINE FLOWS RESULTING FROM THE 1980 OPERATING PLAN WERE NOT "SEPARATELY BARGAINED FOR" AND SHOULD OFFSET DEPLETIONS TO USABLE STATELINE FLOWS

In April 1980, the Arkansas River Compact Administration adopted an Operating Plan for John Martin Reservoir ("1980 Plan"). Report at 47, 173; Jt. Exh. 21, Doc. 11.[56] The 1980 Plan established storage accounts in John Martin for Kansas and ditches in Colorado Water District 67. Report at 47, 173; 1980 Plan, Subsection II D(2) (Report-App. at 111). The Plan guarantees Kansas 40 percent of releases from conservation storage, which go into the Kansas account in John Martin, thereby allowing Kansas to call for releases from John Martin more nearly in accord with crop demands. Report at 47, 173; RT Vol. 84 at 106-07, 109-10 (Helton). Under the Plan, Kansas receives a greater percentage of the releases from conservation storage than it had received in the 1950s and 1960s. Report at 175; RT Vol. 84 at 107 (Helton). Moreover, by allocating a specific percentage of the releases from conservation storage to Kansas, Kansas cannot diminish

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[56] A copy of the 1980 Plan, as slightly modified in 1984, is included in the Report-Appendix at 107-17. Since the 1984 revisions had no effect on the provisions relevant to Colorado's exceptions, we will refer to it. The provisions of the 1980 Plan are described in the Report. Report at 47-48, 173-74. The provisions of the Arkansas River Compact governing the storage and release of water from John Martin Reservoir and the way in which the 1980 Plan modified the historical method of operating the reservoir are more fully described in Order Granting Kansas' Motion to Dismiss Colorado's Well Counterclaim (July 31, 1992). Report at 450-54.

or invade the portion of conservation storage which Colorado ditches are entitled to demand, thereby protecting Kansas from a claim that post-compact well development in Kansas has resulted in additional releases from conservation storage in violation of the Compact. Report at 226-27; Colo. Exh. 300.

The 1980 Plan also authorized three Colorado ditch companies to store "other" water in John Martin. Report at 47, 174; 1980 Plan, Section III (Report-App. at 114-15). This "other" water consists of water which, for the most part, would otherwise be stored in off-channel reservoirs in Colorado. Report at 47-48. As a condition of storing this "other" water in John Martin, the Colorado ditch companies are required to contribute 35 percent of their stored water to a Kansas Transit Loss Account to assist in delivering water released from the Kansas account to the Stateline. *Id.* at 48, 174; 1980 Plan, Subsection III D (Report-App. at 115).

While Kansas has questioned the authority of the Compact Administration to adopt the 1980 Plan, it has accepted the Plan since 1980 and has not exercised its continuing right to terminate the Plan. Report at 48 note 21, 172.[57]

The evidence at trial showed that Kansas received more usable water than it would have received without the 1980 Plan and, in addition, was able to demand

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[57] The 1980 Plan provided that it would continue until March 31, 1981, and year to year thereafter, provided that either Colorado or Kansas could terminate the Plan by giving written notice by a date certain each year. 1980 Plan, Subsection VII A (Report-App. at 116).

releases from John Martin when the water was more beneficial for crop production. RT Vols. 84 at 109-10; 133 at 68-74 (Helton).[58] On the other hand, the three Colorado ditch companies were permitted to store "other" water in John Martin, which is more efficient than off-channel reservoirs in Colorado, and each of the ditches in Water District 67 received its own separate account and could call for water when it was most needed. Report at 176.

The Master concluded that, because the Plan provided benefits to both Kansas and Colorado which were "separately bargained for," the benefits received by Kansas under the Plan should not offset Compact violations. Report at 180-81. Colorado takes exception to this ruling.[59]

The Master rejected Colorado's argument that the increases in usable Stateline flow resulting from the adoption of the 1980 Plan should offset depletions to usable Stateline flows from post-compact well pumping because he concluded that the Plan was intended only to improve the efficiency of the operation of John Martin and nothing in the Plan indicated that it was intended as an offset against compact violations or as a solution to the impact of well pumping in Colorado. Report at 177.

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[58] Based on the results of the Kansas H-I Model, the net increase in usable Stateline flows resulting from the 1980 Plan was about 23,500 acre-feet, using the Durbin usable flow method with the Larson coefficients. Colo. Exh. 975, Comparison 9. The increase does not fully offset depletions to usable Stateline flows from post-compact well pumping, but it does reduce those depletions.

[59] Colorado does not take exception to the Special Master's ruling that the 1980 Plan is not a complete bar to Kansas' claims.

The Master overlooked the first "whereas" clause in the resolution adopted by the Compact Administration. The first "whereas" clause states that the Compact Administration "recognizes that, because of changes in the regime of the Arkansas River, the present operation of the conservation features of John Martin Reservoir does not result in the most efficient utilization possible of the water under its control; . . . " Report-App. at 107. The resolution does not state that post-compact well pumping in Colorado or Kansas was a cause of changes in the regime of the Arkansas River; but Mr. Corrigan, the Kansas Water Commissioner, and Mr. Bentrup, a Kansas representative to the Compact Administration, both of whom were involved in developing the Plan, Report at 173, testified that they suspected that the transit losses below John Martin were due to well pumping. Colo. Exhs. 21 at 165-66; 17 at 49-55.

The Master acknowledges that there were concerns about transit losses, but states that "the evidence indicates that the problem lay primarily with surface diversions by the Colorado ditches, not with wells." Report at 179. This finding is not supported by the record. Ditches in Water District 67 are entitled to divert water released from John Martin for them. Because of transit losses during the dry years of 1977 and 1978, releases from John Martin for Kansas did not produce an equivalent in Stateline flow. RT Vol. 77 at 100 (Danielson). In 1978, the Colorado water commissioner for Water District 67 issued an order to Colorado ditches below John Martin ordering them not to divert during the first 24 hours of a release from John Martin to assist in satisfying a demand by Kansas by an equivalent in Stateline flow, Report at 180;

Arkansas River Compact, Art. V-E(3), but two ditches refused to comply. Report at 180. Thus, the transit loss problem did not lie with surface diversions. That was simply the way the water commissioner had attempted to address the transit loss problem.[60] Both Mr. Corrigan and Mr. Bentrup testified that they suspected the transit losses were in part due to well pumping, but Mr. Bentrup testified that "[t]he methods of getting the water, we figure, were the responsibility of the State of Colorado. It was their responsibility to get the water to the state line. How they did it was really no concern of ours." Colo. Exh. 17 at 56.

The 1980 Plan was drafted in response to Kansas' complaints about transit losses, the objections by the Colorado ditches to the order issued by the water commissioner in 1978, and Kansas' insistence that it was Colorado's responsibility to get Kansas' water to the Stateline.[61] By allocating 40 percent of releases from conservation storage to the Kansas account, by establishing a Kansas Transit Loss Account with water which had been historically used in Colorado, and by making other changes, the 1980 Plan reduced the transit losses and offset some of the depletions caused by post-compact

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[60] Colorado concluded that the water commissioner had erred in ordering the ditches in Water District 67 not to divert. The appropriate course of action would have been for the Compact Administration to increase the release from John Martin "to meet extraordinary conditions." Arkansas River Compact, Art. V-C.

[61] Colorado does not agree that Colorado, rather than the Compact Administration, has the responsibility to deliver water to the Stateline. RT Vol. 77 at 94-95, 97-99 (Danielson).

well pumping in Colorado. RT Vols. 77 at 101 (Danielson); 133 at 68-74 (Helton). General principles of contract law dictate that the increases in usable Stateline flows resulting from the Plan should offset depletions to usable Stateline flows caused by post-compact well pumping in Colorado.[62]

The goal in awarding damages for breach of contract is generally to put the injured party in as good a position as he would have been in had the contract been performed. Restatement (Second) of Contract §344(a) and comment a, §345(a) (1981). However, the injured party cannot recover damages "for loss that the injured party could have avoided without undue risk, burden, or humiliation." Restatement (Second) of Contract §350(1). Likewise, the injured party is not entitled to recover damages which it in fact avoided.

Where, as here, the Compact Administration adopted a plan for more efficient utilization of water under its control because of changes in the regime of the Arkansas River, without determining the cause of those changes, Kansas should not be entitled to recover damages for depletions to usable Stateline flows which did not occur because of the adoption of the Plan. The Special Master suggests, however, that the additional benefits from the 1980 Plan were "separately bargained for," *i.e.*, that the additional benefits were simply an inducement to get

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[62] Since a compact is a contract, the Court has looked to general principles of contract law. *Texas v. New Mexico*, 482 U.S. at 129 (citing Restatement (Second) of Contracts §33(2) and comment b (1981)).

Kansas to accept the Plan. However, the Compact Administration adopted the plan for more efficient utilization of water under its control because of changes in the regime of the Arkansas River. Report-App. at 107. Had there been no changes in the regime of the river, including post-compact well pumping in Colorado and Kansas, there is no reason to assume that the Compact Administration would have adopted the 1980 Plan or that Colorado would have agreed to the Plan. Under those circumstances, Kansas should not be allowed to recover damages that were avoided by adoption of the 1980 Plan. *See* Restatement (Second) of Contracts §89(c) (A promise modifying a duty under a contract not fully performed on either side is binding to the extent that justice requires enforcement in view of material change of position in reliance on the promise.). Colorado relied upon the 1980 Plan in not making demands for releases from John Martin which it was otherwise entitled to make under the Compact. Therefore, to the extent the Plan increases Stateline flows, those increases should offset depletions to usable Stateline flows caused by post-compact well pumping in Colorado.

V. KANSAS SHOULD BE REQUIRED TO PROVE A BREACH OF THE COMPACT BY CLEAR AND CONVINCING EVIDENCE

The Special Master recognized that Kansas, as the plaintiff, had the burden to prove its case. Report at 65. However, he concluded that Kansas need only meet the "preponderance of the evidence" test applicable to ordinary civil litigation, rather than the higher "clear and convincing evidence" test which has been applied in

other controversies between states, *e.g.*, *Colorado v. Kansas*, 320 U.S. 383, 393 (1943); *Alabama v. Arizona*, 291 U.S. 286, 292 (1934); *North Dakota v. Minnesota*, 263 U.S. 365, 387 (1923); *Washington v. Oregon*, 297 U.S. 517, 524 (1936); *Missouri v. Illinois*, 200 U.S. 496, 521-22 (1906). Report at 69-70. Colorado takes exception to this ruling.

The Master began his analysis by noting that in *Nebraska v. Wyoming*, 507 U.S. at ___, 113 S.Ct. at 1694-95, 123 L.Ed.2d at 329-30 the Court had restated its "long-standing" rule that a state seeking an equitable apportionment of an interstate stream must present clear and convincing proof of some real and substantial injury or damages. Report at 65. However, he stated that *Nebraska v. Wyoming* had involved a new refinement of that rule:

> The opinion states that where a Supreme Court decree has been issued in an interstate river apportionment case, a state instituting a later proceeding to *enforce* the decree need not meet the strict standard of proof applicable in the initial proceeding.

Report at 66 (emphasis in original).

The Master then stated that a resulting question "is whether or not the Arkansas River Compact is analogous to a Supreme Court decree, so that Kansas' suit may be viewed as one to enforce the compact and therefore as a proceeding subject to a less demanding evidentiary test than clear and convincing proof." Report at 66.

After discussing two background matters, the Master concluded that the preponderance of the evidence test should apply because he could see no reason why an interstate compact should have any less standing than a

decree of the Court and because rights and duties set forth in a compact ought not be harder to enforce than a decree of the Court. Report at 69-70. While suggesting that the burden of proof might be different depending on the nature of the provision of the Compact be enforced, he ruled that Kansas need only satisfy the traditional burden of proof in ordinary civil litigation to enforce the rights and duties of Article IV-D of the Compact, *i.e.*, the preponderance of the evidence. *Id.* at 70. Colorado disagrees with the Master's analysis and his conclusion.

A standard of proof "serves to allocate the risk of error between the litigants and to indicate the relative importance attached to the ultimate decision." *Herman & MacLean v. Huddleston*, 459 U.S. 375, 389 (1983), *quoting Addington v. Texas*, 441 U.S. 418, 423 (1979); *accord Colorado v. New Mexico*, 467 U.S. 310, 323-24 (1984). As the Court said in *Addington v. Texas*:

> The function of a standard of proof, as that concept is embodied in the Due Process Clause and in the realm of factfinding, is to "instruct the factfinder concerning the degree of confidence our society thinks he should have in the correctness of factual conclusions for a particular type of adjudication."

441 U.S. at 423, *quoting In re Winship*, 397 U.S. 358, 370 (1970) (Harlan, J., concurring).

In civil cases, "society has a minimal concern with the outcome of such private suits, . . . " and a plaintiff is required to prove facts by a "mere preponderance of the evidence." *Addington v. Texas*, 441 U.S. at 423. By contrast, the "clear and convincing evidence" standard has been

required "where particularly important individual interests or rights are at stake." *Herman & MacLean v. Huddleston*, 459 U.S. at 389.

In *Colorado v. Kansas*, the Court addressed the burden of proof on a complaining state to prove an increased depletion to the water supply:

> The question must be answered in the light of rules of decision appropriate to the quality of the parties and the nature of the suit.
>
> In such disputes as this, the court is conscious of the great and serious caution with which it is necessary to approach the inquiry whether a case is proved. *Not every matter which would warrant resort to equity by one citizen against another would justify our interference with the action of a state, for the burden on the complaining state is much greater than that generally required to be borne by private parties. Before the court will intervene the case must be of serious magnitude and fully and clearly proved.* [Emphasis added.]

320 U.S. at 393-94 (footnote omitted).

Contrary to the Master's contention, Report at 68, the Court has explained the reasons for the higher burden of proof in equitable apportionment cases and in other cases where one state seeks the assistance of the Court to interfere with actions of another state. Such cases involve interests of quasi-sovereign states and frequently involve important questions of public law. *Washington v. Oregon*, 297 U.S. at 529 ("We are to bear in mind steadily that the controversy is between states, and not between private litigants, the burden and quantum of the proof being governed accordingly," *citing North Dakota v. Minnesota*,

263 U.S. 365 [1923]".); *Virginia v. West Virginia*, 234 U.S. 117, 121 (1914) ("As we have pointed out, in acting in this case from first to last the fact that the suit was not an ordinary one concerning a difference between individuals, but was a controversy between states, involving grave questions of public law, determinable by this court under the exceptional grant of power conferred upon it by the Constitution, has been the guide by which every step and every conclusion hitherto expressed has been controlled."); *Missouri v. Illinois*, 200 U.S. at 520-21.

The higher burden on the complaining state is tempered by the liberal rules allowing full development of the facts in controversies between states, *United States v. Texas*, 339 U.S. 707, 715 (1950), rules which are also applied to guard against the possibility of error. As the Court said in *Virginia v. West Virginia*, in allowing West Virginia to file a supplemental answer which would have been denied in a case between ordinary litigants:

> This conclusion, which we think is required by the duty owed to the moving state, also in our opinion operates no injustice to the opposing state, since it but affords an additional opportunity to guard against the possibility of error, and thus reach the result most consonant with the honor and dignity of both parties to the controversy.

234 U.S. at 121.

Thus, the quality of the parties, the importance of a just resolution of controversies between states, and the need to guard against erroneous factual conclusions in such cases are the reasons for the higher burden of proof in cases between states. The Master concluded that the

preponderance of the evidence standard should be applied in this case, however, because he felt that rights and duties set forth in a compact ought not to be harder to enforce than they would be if contained in a decree of the Court. Report at 75. This confuses an action to enforce a judgment with a case in which one state alleges that another state has breached an interstate compact.

This Court has the right to enforce its judgments in controversies between states. *Virginia v. West Virginia*, 246 U.S. 565, 591 (1918); *see Spallone v. United States*, 493 U.S. 265, 276 (1993) (courts have inherent power to enforce compliance with their lawful orders through contempt). A decree in a controversy between states is entered only after the Court has determined that the case is of serious magnitude and fully and clearly proved, and has reached a result which is "most consonant with the honor and dignity of both parties to the controversy." *Virginia v. West Virginia*, 234 U.S. at 121. The Court, having given the states the "amplest opportunity to be heard" and applied the "largest justice" to the disposition of the case, has a substantial interest in seeing its decree complied with. *Id.* Applying a higher burden of proof to a subsequent proceeding to enforce the decree would lessen the force of the Court's decree by making it more difficult to enforce.[63]

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[63] Consider, for example, where a court in a civil case has made a finding which requires a higher burden of proof, *e.g.*, charges of fraud, suits on oral contracts to make a will, suits to establish the terms of a lost will, suits for specific performance of an oral contract, 2 McCormick on Evidence §340 at 443-44 (3rd ed. J. Strong, ed. 1992) (listing classes of cases in which higher burden of proof applies), and has entered a decree determining the rights of the parties. The court doesn't have the same reason to apply a higher burden of proof to an action to enforce the decree that it did in making the finding in the first instance.

The Master felt that the same considerations apply in a suit to enforce rights and duties set forth in an interstate compact. This misunderstands an important distinction between a judicial determination of rights in a case between states and a compact.

A judicial decree in a case between states is limited to a determination of rights based on a present, existing controversy. *Massachusetts v. Missouri*, 308 U.S. 1, 15 (1939). It is entered only after the Court has determined that the case is of serious magnitude and fully and clearly proved, and has carefully weighed the evidence and reached a decision which is fair and equitable. *Virginia v. West Virginia*, 234 U.S. at 121.

A compact on the other hand is a method for resolving an interstate matter without a judicial determination of rights. *Hinderlider v. La Plata River & Cherry Creek Ditch Co.*, 304 U.S. 92, 104 (1938). A compact can be more flexible; it can address matters which are not the subject of a present controversy, including, as in this case, future developments. While it may be true that in some cases the rights and duties set forth in a compact could have been determined by a decree of this Court, it is also true that in some cases the rights and duties set forth in a compact could not have been judicially determined at the time the compact was entered and may not have received the same careful crafting as a judicial decree. Thus, different considerations are present in an action to enforce a decree of the Court.

Moreover, the higher burden of proof in a case to enforce a compact is consistent with the rules allowing full development of the facts that were applied in this case.[64] The Court allows full development of the facts in cases between states to guard against the possibility of error. The "clear and convincing" standard of proof should apply for the same reason.

In discussing "background matters," the Master stated the higher standard penalizes downstream states which will invariably be the party which is required to carry the burden, and that such a rule does not appear consistent with the equality of right among states. This is not correct. As the opinions in *Colorado v. New Mexico*, 459 U.S. 176, 187-88 (1982); 467 U.S. 310, 315-17 (1984), make clear, the burden of proof does not invariably fall upon the downstream state in equitable apportionment cases.

Further, the Master's reasoning ignores the fact that the limitations of Article IV-D and V-H in the Arkansas River Compact apply equally to Kansas, the downstream

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[64] Although the Pre-Trial Order had set a cut-off date for identifying exhibits, Report-App. at 73-74, Kansas repeatedly sought leave to offer revised and new exhibits on the grounds that in a case between states, the Court allows full development of the facts. *E.g.*, RT Vol. 9 at 88-89. Further, Kansas sought a lengthy continuance to replace its chief technical expert, and the Special Master granted the continuance in part for the same reason. Report-App. at 91. It is simply not fair to allow a plaintiff state to take advantage of the liberal rules allowing full development of the facts, then apply the preponderance of the evidence standard. If society does not have a significant interest in the outcome of compact enforcement suits between states, there is no reason to apply the liberal rules allowing full development of the facts in such cases.

state. The Colorado Commissioners who negotiated the Arkansas River Compact insisted that the provisions of Article IV-D and V-H apply to Kansas because they were concerned that Kansas would increase its irrigated acreage and place a greater demand on releases from John Martin Reservoir. Record of the Twelfth Meeting of the Colorado-Kansas Arkansas River Compact Commission at 12-13 (Feb. 3, 4, 5, and 6, 1948); Record of the Seventeenth Meeting at 17-33 to 17-36 (Dec. 13 and 14, 1948) (Jt. Exh. 3). Thus, the downstream state is not invariably the complaining party in an equitable apportionment case or an action to enforce a compact apportioning an interstate stream.

Nor is the higher burden of proof in interstate water cases inconsistent with the equality of right among states.[65] The rules of procedure and the higher burden of proof in cases between states reflect the equal level or plane on which all states stand under our constitutional system, and the importance of confidence in factual conclusions before the Court will interfere with the actions of a state.

Finally, even if the preponderance standard would otherwise apply, Kansas' delay in bringing its claims should "gravely add" to the burden it would otherwise bear. *Colorado v. Kansas*, 320 U.S. at 394.

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[65] The equality of right does not imply some sort of mathematical equality. *See Connecticut v. Massachusetts*, 282 U.S. 660, 670-71 (1931).

CONCLUSION

Colorado recommends that its exceptions to the Special Master's Report be granted and that the case be remanded to the Master for further proceedings and completion of the remedy phase consistent with the Court's opinion.

Respectfully submitted,

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No. 105, Original

In The
Supreme Court of the United States
October Term, 1994

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant.

ON EXCEPTIONS TO THE REPORT OF THE SPECIAL MASTER

BRIEF OF THE STATE OF WYOMING AS *AMICUS CURIAE*

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ON EXCEPTIONS TO THE REPORT OF
THE SPECIAL MASTER

BRIEF OF THE STATE OF WYOMING AS *AMICUS CURIAE*

The State of Wyoming submits this brief as *amicus curiae* pursuant to Sup.Ct.R. 37.5. This brief is submitted in compliance within the time permitted for exceptions to the Special Master's Report. *Kansas v. Colorado*, 115 S.Ct. 48 (1994); Sup.Ct.R. 37.3.

INTEREST OF THE STATE OF WYOMING AS *AMICUS CURIAE*

The State of Wyoming is the defendant in the pending original action brought by the State of Nebraska to modify the Court's North Platte River Decree, *Nebraska v. Wyoming*, 325 U.S. 589 (1945), *modified*, 345 U.S. 981 (1953). *Nebraska v. Wyoming*, No. 108 Original. In addition, Wyoming is a party to

both interstate compacts and Court decrees governing the use of its waters. *E.g.*, *Yellowstone River Compact*, 66 Stat. 663 (1951); *e.g.*, *Wyoming v. Colorado*, 259 U.S. 419, 496, *modified*, 260 U.S. 1 (1922), *vacated and new decree entered*, 353 U.S. 953 (1957). Therefore, the State of Wyoming has a direct interest in the proper and equitable administration of water rights on an interstate basis.

The Special Master's Report in this case includes a discussion and a recommendation with regard to the standard of proof necessary to prevail in interstate water allocation suits before this Court. Special Master's Report at 65-70. To the extent that discussion could be read as a recommendation that the Court reconsider the traditional high burden of proof most recently repeated and applied in *Nebraska v. Wyoming*, 113 S.Ct. 1689 (1993), Wyoming takes exception to that recommendation. Wyoming's brief is directed solely toward the Special Master's discussion of the burden of proof in cases involving the equitable apportionment of interstate streams. Wyoming does not address the factual matters contained in the Special Master's Report.

SUMMARY OF ARGUMENT

The State of Wyoming is the defendant in a pending original action in which the Court has announced that it will rely on well-established precedent to require proof of real and substantial injury by clear and convincing evidence before exercising its extraordinary power to limit or restrict Wyoming's sovereign power over its portion of an interstate stream. As a result, Wyoming finds no merit or support for the recommendation that the Court relax the standard of

proof imposed in interstate water disputes. The Court established the standard of proof in recognition of the dignity and status of the parties as sovereign states. The Court should retain the standard in order to prevent the compromise of the rights of states except in the most necessary situations. Moreover, in the nearly ninety years since the precedent was established, states have come to expect that they must meet a high standard of proof, both to invoke the Court's jurisdiction and to obtain relief in such cases. Any change in the standard could have a substantial effect on the number of cases filed to invoke the Court's original jurisdiction.

ARGUMENT

IN AN ACTION BETWEEN STATES THE STANDARD OF PROOF SHOULD REMAIN ELEVATED WHEN THE REMEDY SOUGHT WOULD ALTER THE RIGHTS OF THESE STATES

The Special Master's Report contains a brief section on the standard of proof in this proceeding. Report of the Special Master, Section VIII, pp. 65-70. However, the conclusion reached in those five pages affects enormously the remainder of the questions the Special Master addresses in his report and, if adopted, could change the rules in equitable apportionment cases within the Court's original jurisdiction.

The Special Master recommends that Kansas be required to prove its case by only a preponderance of the evidence. Special Master's Report at 70. However, the Special Master does not limit his discussion of the issue to the controversy at hand. His commentary on the

development of the standard of proof touches upon all interstate original jurisdiction water rights litigation. Much of his discussion traces the development of the clear and convincing evidence standard of proof applied by the Court to equitable apportionment of interstate streams. Special Master's Report at 65. *See, e.g., Idaho v. Oregon*, 462 U.S. 1017, 1027 (1983). He then concludes that there is no real explanation for the clear and convincing evidence standard in original jurisdiction actions. Special Master's report at 66, 68.

Included in the discussion is an unsupported perception that geography and gravity may compound an inherent unfairness to applying the standard in apportionment proceedings:

> Second, on an interstate stream, the downstream state will normally be the complaining party. As such it will also invariably be the party which is required to present a very strong case in order to obtain relief. In contrast to actions involving private water rights, the Court's special rule for burden of proof in equitable apportionment cases adds a significant legal inequality to the natural inequality already imposed by geography. The ideal of federalism - that each state is on an equal footing with all other states - seems poorly served by a rule which routinely penalizes all downstream states.

Special Master's Report at 68-69.

The Special Master overlooks that the reason for the heightened standard in original actions relates to

the nature of the litigants: states that enjoy sovereignty limited only by the U.S. Constitution. *Gulf Offshore Co. v. Mobil Oil Co.*, 453 U.S. 473, 478 (1981). In recognition and respect of that sovereignty, the Court restricts the exercise of its jurisdiction over the states to controversies of a serious magnitude. The Court will not exercise its original jurisdiction over states except in cases of absolute necessity. *Alabama v. Arizona*, 291 U.S. 286, 291 (1934). The Supreme Court's original jurisdiction provides an alternative to settling important controversies between sovereigns that traditionally could be settled only through diplomacy or war. *North Dakota v. Minnesota*, 263 U.S. 365, 372-73 (1923), *Nebraska v. Wyoming*, 325 U.S. at 608, *Mississippi v. Louisiana*, 113 S.Ct. 549, 553 (1992).

The heightened standard of proof expresses the Court's policy that the controversies between states within its original jurisdiction have a certain dignity and seriousness. The Court applies the higher standard to limit the cases it hears and to guide the use of its extraordinary power in those cases it accepts in its original jurisdiction. The nature of the parties, whether states or private litigants, directly bears upon the burden and quantum of proof. *Washington v. Oregon*, 297 U.S. 517, 529 (1936). The fact that these disputes are not ordinary lawsuits between individuals, but controversies between states, involving grave questions of public law, has guided the Court in its determinations. *Virginia v. West Virginia*, 234 U.S. 117, 121 (1914). Before the Court will act, a threatened invasion of rights must be of serious magnitude and established

by clear and convincing evidence. *Wyoming v. Oklahoma*, 502 U.S. 437 (1992). As the Court noted in *Colorado v. Kansas*, 320 U.S. 3823(1943):

> The question must be answered in the light of rules of decision appropriate to the quality of the parties and the nature of the suit. In such disputes as this, the Court is conscious of the great and serious caution with which it is necessary to approach the inquiry whether a case is proved. Not every matter which would warrant resort to equity by one citizen against another would justify our interference with the action of a state, for the burden on the complaining state is much greater than that generally required to be borne by private parties. Before the Court will intervene the case must be of serious magnitude and fully and clearly proved.

Id. at 393.

While the Special Master says that the higher standard of proof is a "latecomer" in original actions, Special Master's Report at 66, the standard has been the rule that has guided the Court in all of its interstate water cases. *See, e.g., Missouri v. Illinois*, 200 U.S. 496 (1906). Furthermore, the time when a precedent was developed holds no particular bearing on the weight it carries. For example, the importance of the rights articulated first in *Miranda v. Arizona*, 384 U.S. 436 (1966), is not diminished because they were announced only some 36 years ago. The importance of the higher standard of proof is the reason the Court continues to apply it in contemporary interstate water proceedings.

E.g., Colorado v. New Mexico, 467 U.S. 310 (1984), *Nebraska v. Wyoming*, 113 S.Ct. 1689 (1993). Relaxing the standard would foster more frequent attempts by states to invoke the Court's original jurisdiction and dissuade states from attempting to resolve their differences without resorting to litigation.

In *Nebraska v. Wyoming, supra*, the Court discussed the difference between an action to enforce rights already adjudicated and an action to modify those rights. *Nebraska v. Wyoming*, 113 S.Ct. at 1694-96. In an enforcement proceeding, a plaintiff need show only a violation of those rights in order to prevail; a showing of injury is not required. 113 S.Ct. at 1695, *citing Wyoming v. Colorado*, 309 U.S. 572, 581 (1940). However, if a state seeks a new apportionment or a modification of an existing apportionment, no pre-existing right exists to enforce or interpret. 113 S.Ct. at 1695. In that case a state must make a showing of substantial injury to be entitled to relief. *Id.* at 1696.

> That is so not only because a new injunction would work a new infringement on sovereign prerogatives, but also because the interest of certainty and stability counsel strongly against reopening an apportionment of interstate water rights absent considerable justification.

Id. Wyoming urges the Court to continue to adhere to that precedent.

The Special Master suggests that in this case the standard should not apply because of Kansas' perceived disadvantage as a downstream state. Special Master's Report at 68-69. That observation is unsupported and

incorrect if it implies that only downstream states are plaintiffs in equitable apportionment cases. In *Colorado v. New Mexico*, 467 U.S. 310 (1984), Colorado, the upstream state, sought an apportionment of the Vermejo River. *Id.* at 312. In *Arizona v. California*, 460 U.S. 605 (1983), the upstream state, Arizona, was the plaintiff in a dispute to apportion the waters of the Colorado River. In pending proceedings before the Court, Wyoming has brought counterclaims against downstream Nebraska alleging Nebraska violations of the North Platte Decree. *Nebraska v. Wyoming*, No. 108, Original. Moreover, geography plays no role at all in other interstate disputes where the Court applies the higher burden of proof to limit the cases it considers under its original jurisdiction. *E.g., Wyoming v. Oklahoma*, 502 U.S. 437 (1992). Geography - or the law of gravity - has no bearing on whether to apply the higher standard of proof to decide whether to interfere with a state's sovereign rights.

CONCLUSION

This Court has applied a heightened standard of proof to its original jurisdiction cases between states in order to recognize and protect the dignity and sovereignty of the litigants. The Court should continue to apply the higher standard in interstate disputes within its original jurisdiction. To the extent the Special Master recommends a break from precedent, the Court should decline the recommendation.

Dated: November 17, 1994

Respectfully submitted,

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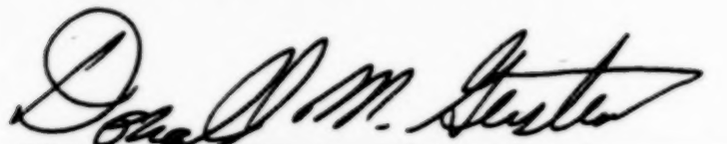

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In The

Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

UNITED STATES OF AMERICA,

Defendant-Intervenor.

COLORADO'S REPLY BRIEF

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In The

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COLORADO'S REPLY BRIEF

The State of Colorado submits this reply to Kansas' Exceptions to the 1994 Report of the Special Master and Brief in Support of Exceptions (Kansas' Brief).

I. INTRODUCTION

Special Master Arthur L. Littleworth, Esq., presided over 141 days of trial, over a period of more than two years, much of it involving highly technical expert testimony. Report at 28-31. He has prepared a 459-page report which addresses the claims of the parties and sets forth his conclusions and recommendations on those claims. While Colorado does not agree with every ruling of law and finding of fact made by the Master, he is to be

commended for a thorough and carefully considered report. He has stated the reasons for his decisions and identified the evidence on which he relied in reaching his decisions. We note this at the outset because Kansas does not fairly or accurately describe the Special Master's decisions to which it takes exception.

II. THE MASTER CORRECTLY GRANTED COLORADO'S MOTION TO DISMISS KANSAS' TRINIDAD RESERVOIR CLAIM

Kansas first takes exception to the Master's decision granting Colorado's motion to dismiss Kansas' Trinidad Reservoir claim at the conclusion of Kansas' evidence. Kansas' Brief at 12-26. Kansas contends that "violation of the Compact Administration's duly adopted Trinidad Reservoir Operating Principles constituted a violation of the [Arkansas River] Compact." *Id.* at 12. Kansas further contends that the Compact Administration "adopted" the Operating Principles to implement and prescribe procedures for the operation of Trinidad Reservoir under Article VIII-B of the Compact.[1] *Id.* at 15. Kansas argues that the Operating Principles are therefore mandatory and enforceable without proof of a violation of Article IV-D of the Compact. *Id.* at 15-24.

The Master articulated the issue in his decision:

> The fundamental issue on which the Colorado motion turns is whether Kansas is required to show a material depletion in stateline flows

[1] The provisions of the Compact are set forth in Exhibit 1 of the Appendix to the July 1994 Report of the Special Master. Report-App. 1-17.

> caused by the operation of Trinidad Reservoir, or is required to prove only that the Operating Principles for the Project were violated, and that such violation caused less water to flow into John Martin Reservoir than would have occurred under strict compliance with the Operating Principles. Kansas did not attempt to establish that the flows of the Arkansas River at the state line were less than they would have been if the Trinidad Project had not been constructed or operated at all.

Report at 379.[2] The Master concluded that the Operating Principles had not been "adopted" by the Compact Administration to prescribe procedures for the operation of Trinidad Reservoir under Article VIII-B of the Compact and that Kansas' evidence did not establish a Compact violation. *Id.* at 407-28.

The Master's decision so well describes the evidence, Kansas' arguments, and the basis for his decision that we will merely summarize the essential points of his decision.

A. Background to the Master's Decision

The Master describes the Trinidad Dam and Reservoir Project, the development of Operating Principles for the Project, and Kansas' complaints about the operation

[2] Decision of Special Master on Colorado's Motion to Dismiss Kansas' Trinidad Reservoir Claim (Jun. 9, 1992), *printed in* the July 1994 Report of Arthur L. Littleworth, Special Master, Part III, Vol. III at 373-433. Because the Report is paginated consecutively from beginning to end, we will simply cite to the page numbers of the Report.

of the Project in his decision. Report at 380-99. Very briefly, Congress authorized the Trinidad Project in 1958 to meet flood control and irrigation needs on the Purgatoire River near the City of Trinidad, Colorado. *Id.* at 382-87; Flood Control Act of 1958, Pub. L. No. 85-500, 72 Stat. 297, 309 (Jt. Exh. 35).[3] After the Trinidad Project was authorized, the U.S. Bureau of Reclamation ("Bureau") conducted operation studies on the irrigation function of the Project. Report at 388. The initial study was completed in 1961. *Id.* The concept of equal sharing of the Project water supply among the various irrigation ditches assumed in the 1961 operation study was unacceptable to the Purgatoire River Water Conservancy District[4] and a revised operation study was completed in 1964, which included Operating Principles for the Project. *Id.* at 388-89. The Operating Principles were submitted for review and were approved by the U.S. Army Corps of Engineers, the Colorado Water Conservation Board, and the Purgatoire River Water Conservancy District. *Id.* at 391. In addition, the Operating Principles were submitted to the Kansas Water Resources Board and the Compact Administration. *Id.*

In December 1966, the Governor of Kansas asked the Bureau to agree to five conditions to the Operating Principles, to which the Bureau and the Purgatoire River

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[3] The page numbers in the reporter's transcript at which exhibits were admitted are indicated in the Table of Exhibits.

[4] The Purgatoire River Water Conservancy District was formed in December 1960 for the purpose of contracting with the United States for repayment and management of the Project water supply and to represent the irrigation systems to be included in the Project in conducting the irrigation studies for the Project. Jt. Exh. 24a at vi, 7.

Water Conservancy District agreed, and the Operating Principles, as so amended, were approved by the Compact Administration in 1967. Report at 391-95.

In February, 1967, the United States entered into a repayment contract with the Purgatoire River Water Conservancy District for construction, operation, and maintenance of Trinidad Reservoir in accordance with the Operating Principles. Report at 393-94; Jt. Exh. 39.

The Corps of Engineers then constructed Trinidad Dam and Reservoir and substantial storage of water began in 1979. Report at 395-96.[5] In 1980, Kansas complained about the way Trinidad Reservoir was being operated. *Id.* at 397.[6] Kansas requested an investigation by the Compact Administration, which made findings of fact, but could not agree that the operations were in violation of Article IV-D of the Compact. Report-App. at 56.

B. The Bureau of Reclamation's Review of the Trinidad Project Operating Principles

The Master noted that Kansas' legal theory is based upon an alleged violation of Operating Principles for the

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[5] Trinidad Reservoir was completed and declared ready to store water on January 1, 1977, but litigation in Colorado delayed any substantial storage until March 1979. Report at 395-96; *Purgatoire River Water Conservancy District v. Kuiper*, 197 Colo. 200, 593 P.2d 333 (1979) (reversing trial court order enjoining storage in the reservoir).

[6] Kansas' prompt complaint about the operation of Trinidad Reservoir stands in stark contrast to its lengthy delay in complaining about post-compact well pumping in Colorado.

Trinidad Project. Report at 378. The Master assumed for the purpose of his ruling that the Trinidad Project had been operated in violation of the Operating Principles, *id.*, but concluded that merely showing that operation of the Project had not been in accordance with the Operating Principles did not prove a violation of Article IV-D of the Compact. *Id.* at 424-28. He noted that the operating studies on which the Operating Principles had been based had predicted an increase in inflow to John Martin Reservoir of 400 acre-feet per year. *Id.* at 390. During a review of the Operating Principles which was completed in December 1988, the Bureau developed a computer model to reconstruct its earlier operation studies. *Id.* at 399. The model showed that under the conditions of the 1964 study the inflow to John Martin would have actually increased by an average of 1,000 acre-feet per year compared to a "without project" condition. *Id.* Using the model, the Bureau then assumed operation with two practices about which Kansas had complained in this case. *Id.* at 400. The estimated inflow to John Martin Reservoir predicted by the model was less, but still showed an average increase of 300 acre-feet annually. *Id.*

The Bureau concluded on the basis of these and other studies that the two practices about which Kansas had complained would not cause the future usable inflow to John Martin Reservoir to be less with the Trinidad Project than it would have been without the Project. Report at 401.

The Bureau also did additional studies to compare actual operation of the Trinidad Project during the years 1979 through 1984 with operation of the Project in strict compliance with the Operating Principles. Report at 402. The Bureau did three "case studies." It concluded that

Case 1, which showed a net increase in flows into John Martin Reservoir of 3,500 acre-feet over the study period, was the most reasonable for the purpose of evaluating injury to downstream rights. *Id.* at 403. However, the Bureau cautioned that none of the 1979-84 studies was a sound basis for evaluating future impacts of the Project and did not compare the actual operation of the Project to operation without the Project. *Id.* at 404.[7]

Based on its review, the Bureau concluded that the two practices about which Kansas had complained were departures from the intent of the Operating Principles and recommended that the practices be discontinued until the Operating Principles had been amended to permit the practices. Report at 404-05. The Colorado State Engineer then informed the Purgatoire River Water Conservancy District that he would administer the Project water rights consistent with the Bureau's interpretation of the Operating Principles until they had been amended or until a court of competent jurisdiction had determined that the practices were not a violation of the Operating Principles. *Id.*; Jt. Exh. 52.

C. Kansas' Evidence

At trial, Kansas' expert, Brent E. Spronk, using the Bureau's Case 1 and Case 3 studies, calculated depletions

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[7] The Bureau stated that it had investigated making a "without project" comparison but concluded that there was not sufficient information available to make meaningful comparisons. Report at 404. The Bureau did not say that a "no-project" comparison was "impossible." Kansas' Brief at 9. Nor did Kansas' expert, Brent E. Spronk, claim that such a study was impossible. *See* Report at 412.

to the inflow to John Martin Reservoir based on the differences between actual inflows during the 1979-84 period and inflows that would have occurred under strict compliance with the Operating Principles. Report at 410. In making this analysis, Mr. Spronk looked only at the months in which depletions had occurred to the inflow to John Martin compared to operation in strict compliance with the Operating Principles, then totalled the depletions. *Id.* As the Master states: "He deliberately chose not to offset those depletions by the many months during which the Trinidad Project increased inflows to John Martin." *Id.* On that basis, Mr. Spronk concluded that the additional inflow into John Martin Reservoir during the 1979-84 period, under strict compliance with the Operating Principles, would have been between 24,500 acre-feet and 27,500 acre-feet, of which he assumed Kansas would have been entitled to 40 percent. *Id.*

This analysis reflected Kansas' legal theory that any depletion to the inflow to John Martin Reservoir in any month resulting from failure to operate the Project in strict compliance with the Operating Principles was a Compact violation *per se*. Report at 407-09.[8] It also reflected Kansas' legal theory that the Operating Principles had to be complied with each month, without consideration of averages. *Id.* at 410. As the Master pointed out:

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[8] As the Master points out, the legal theory advanced at trial was not apparent from the face of the complaint. Report at 407. Moreover, at a conference with the Master in 1988, counsel for Kansas had agreed that Kansas had to prove a material depletion of Stateline flow caused by the Trinidad Project. Transcript of Proceedings (Sep. 28, 1988) at 39-40 (Colo. Appendix at 1a).

> Under the evidence in this case, such a measure of damages would afford Kansas significant benefits from the project, as opposed to merely protecting Kansas and other downstream users against material depletions.

Id. at 409.

D. Summary of the Master's Decision and Reasons for Rejecting Kansas' Claim

The Master concluded that the evidence presented by Kansas did not establish a violation of Article IV-D of the Compact because it was not based on an analysis of what the inflows to John Martin would have been if the Project had not been operated during the years 1979-84. Report at 411-12, 423-26. Mr. Spronk testified that such a study was not necessary to determine the depletions that had occurred as a result of departures from the Operating Principles and would be difficult to do because of uncertainty in estimating diversions in the absence of the Project. *Id.* at 412.[9]

The Master also rejected Kansas' argument that the Compact Administration had "adopted" the Operating Principles to implement and prescribe procedures for operation of Trinidad Reservoir under Article VIII-B of the Compact:

> I have carefully examined the record presented here of the Compact Administration's

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[9] However, that was exactly what Kansas attempted to do when it developed the H-I Model to estimate changes in Stateline flow assuming the Winter Water Storage Program had not been operated. Report at 231-32.

> consideration of the Trinidad Project. I find nothing to indicate that the Compact representatives of either State thought they were exercising binding authority under Article VIII-B. And the consequences of such authority, as argued by Kansas, makes it less rather than more appropriate that such action should be implied.

Report at 415. One consequence of such authority would be that no change in the operation of the Project could be made without a unanimous vote of both states. Arkansas River Compact, Art. VIII-D.

The Master pointed out the problem with Kansas' argument by turning the facts around. Report at 415. "Assume," he said, "that the Operating Principles were strictly observed, but nonetheless the actual Trinidad operations still caused a material depletion in the usable flows to Kansas users." *Id.* He stated: "Under the Kansas legal theory, the State of Kansas would have no recourse so long as the Operating Principles had been adopted by the Compact Administration pursuant to Article VIII-B." *Id.* He stated: "Colorado disagrees with this Kansas view, and so do I." *Id.* at 416 (footnote omitted). The Master concluded:

> Under the assumed facts, Kansas would permit the Compact Administration to write out of the Compact the critical Article IV-D requirement that no new development in Colorado may cause a material depletion in usable flows to Kansas users. Such action would not implement, but rather would amend the Compact. Of course, the Compact Administration was not delegated power to change the Compact. No matter what operational criteria are followed,

> that is, whether the project is operated in compliance with the Operating Principles, or not, or under appropriately modified Principles, the requirements of Article IV-D must still be met.

Id. at 416.

The Master went on to note that other provisions of the Compact also cast doubt on Kansas' theory that the Compact Administration had authority to prescribe procedures under the Compact to bind Colorado, the Purgatoire River Water Conservancy District, or the United States on the operation of the Trinidad Project. Report at 417-18.[10]

The Master recognized that Kansas argued that the Operating Principles were enforceable as binding action by the Compact Administration apart from any violation of Article IV-D of the Compact because it wants to use the unanimous consent requirement of the Compact to veto amendments to the Operating Principles in order to preserve significant benefits from the Project. Report at 409, 419. The Master not only rejected Kansas' argument, but admonished Kansas that it could not unreasonably withhold approval of amendments to the Operating Principles simply to preserve benefits from the Project at the expense of water users who had contracted with the

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[10] Earlier the Master had ruled that the historical record did not support Kansas' argument that the Compact negotiators had intended to give the Compact Administration power to control future federal operations on the Arkansas River. Report of Special Master Re Winter Storage Motions (Sep. 15, 1989), *printed in* Report at 350. Kansas did not take exception to this ruling.

Purgatoire River Water Conservancy District to administer their water rights in return for repayment of the Project's costs. *Id.* at 423-24, 425, 432.

Kansas argues, however, that unless the Operating Principles are binding on Colorado, the Compact Administration's approval of the Operating Principles was "a useless act." Kansas' Brief at 22. This argument misunderstands the role of the states in the review of federal irrigation projects and the powers of the Compact Administration under the Compact.

Section 1(c) of the Flood Control Act of 1944, 33 U.S.C. §701-1(c)(1988) (Colo. Appendix at 3b-4b), requires the Secretary of the Interior to submit plans, proposals, and reports for irrigation and purposes related thereto to the Secretary of the Army and "affected States"[11] for their "views and recommendations." Report at 348. In the event a submission of views and recommendations made by an affected state sets forth objections to the plans or proposals covered by the report of the Secretary of the Interior, the proposed works shall not be deemed authorized except upon approval by an act of Congress, 33 U.S.C. §701-1(c), although in practice the Secretary of the Interior generally does not proceed with reclamation projects without congressional authorization. A. Golze, *Reclamation in the United States* 125 (1961) (Colo. Appendix at 1c). Thus, affected states have an opportunity to submit "views and recommendations" on federal plans, but not the right to approve or disapprove such plans. Report at 348.

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[11] The term "affected State or States" is defined in Section 1(a) of the Flood Control Act of 1944. 33 U.S.C. §701-1(a) (Colo. Appendix at 2b).

The submission of the Operating Principles to the Kansas Water Resources Board and the Compact Administration was consistent with the policy expressed in Section 1 of the Flood Control Act of 1944, although it was not required since the Trinidad Project had already been authorized by an act of Congress.

The Compact Administration's review and approval of the Operating Principles was also consistent with its powers under the Compact. The Compact Administration has authority to investigate violation of the Compact or other actions prejudicial thereto. Arkansas River Compact, Art. VIII-H. As a result of an investigation, the Compact Administration can make findings and recommendations to the state official who is charged with the administration of water rights for appropriate action. *Id.* However, the findings of fact made by the Compact Administration are not conclusive in any court or before any agency or tribunal, *id.*, Art. VIII-I, and recommendations by the Compact Administration are not and were not intended to be binding on state officials in the event they disagreed with the Administration's recommendations. At the seventeenth and final meeting of the Commission which negotiated the Compact, the Commissioners clarified the powers of the Compact Administration in response to proposals by J.W. Dixon of the Bureau of Reclamation to modify Article V-H of the Compact:

> Chairman Kramer asked Commissioner Ireland to make a statement for the Record. . . . Commissioner Ireland stated that it had been brought out that the effect of the proposals as expressed by Mr. Dixon would be to grant quasi-judicial functions to the Administration,

> something that might not be possible from a constitutional standpoint, even though all the parties desired it; that it had been suggested that if Mr. Dixon's wording constituted the setting up of a condition precedent which would prevent any attempt to go into court, or any attempt to transfer or exchange water regardless of the merits of the situation, until there was a confirmation, and required that such a confirmation have the unanimous concurrence by both Colorado and Kansas as represented on the Administration, then the context should be modified; that it should be consistent with other language in the Compact, as to the extent to which findings of fact by the Administration would be applicable; that the findings would constitute nothing more than prima-facie evidence if they were question [sic]; that they would not be final and conclusive; that it had been emphasized, that whether or not the Compact would in the future be violated by one state or another was up to the respective state officials who would make such determination; that if the officials of one or the other state thought there had been a violation, the only recognized remedy would be for it to go into Court; that this would ultimately mean the United States Supreme Court; . . .

Record of Seventeenth Meeting of the Colorado-Kansas Arkansas River Compact Commission at 17-83 to 17-84 (Jt. Exh. 3).[12]

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[12] Commissioner Ireland's statement is consistent with earlier statements during the Compact negotiations. Record of Twelfth Meeting of the Colorado-Kansas Arkansas River Compact Commission at 12-48 (Statement by General Kramer) (Jt. Exh. 3) (Colo. Appendix at 1d); *id.* at 12-52 to 12-53 (Statement read by Attorney General Hinckley of Colorado) (Colo. Appendix at 1d-2d).

The Compact Administration's review and approval of the Operating Principles is consistent with the limited powers conferred upon the Administration to conduct investigations and make findings of fact and recommendations. *See* Report at 341-50. Thus, as the Master notes, the mere fact that the Administration reviewed and approved the Operating Principles does not suggest that the representatives from either state thought they were exercising binding authority to prescribe procedures for the operation of a federal reservoir under Article VIII-B of the Compact. *Id.* at 415.

Moreover, the Compact Administration's approval of the Operating Principles does not mean that a departure from the Operating Principles would necessarily result in a material depletion in violation of Article IV-D of the Compact. Report at 422. As the Master points out, even if one were to construe the Compact Administration's approval of the Operating Principles as a finding of fact that a departure from the Operating Principles would result in a Compact violation,[13] that finding would be merely "prima facie evidence of the facts found." *Id.* at 421; Arkansas River Compact, Art. VIII-I. As the Master notes, there is "ample evidence" in the record on which a trier of fact could determine that the departures from the Operating Principles of which Kansas had complained

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[13] A more reasonable interpretation of any such finding would be that compliance with the Operating Principles would not result in a Compact violation. Report at 422. The converse is not necessarily true, since a departure from the Operating Principles could actually benefit Kansas.

had not materially depleted the inflow to John Martin under the Compact. Report at 421.

Kansas argues that the Master's ruling allowed Colorado to disregard the Trinidad Project Operating Principles "with impunity." Kansas' Brief at 9. Colorado has never suggested that the Purgatoire River Water Conservancy District or Colorado could disregard the Operating Principles "with impunity." However, Colorado insisted that if Kansas wanted to assert a claim based on failure to comply with the Operating Principles, the Purgatoire River Water Conservancy District should be joined as a party in the action, *see* Fed.R.Civ.P. 19, and that this Court was not the only forum for such an action and not necessarily the appropriate forum for such a lawsuit. RT Vol. 1 at 39-44; *United States v. Nevada*, 412 U.S. 534 (1973) (per curiam) (denying motion for leave to file suit against Nevada where local water right owners would not have an opportunity to participate and federal district court had concurrent jurisdiction). Kansas did not allege a claim for failure to comply with the Operating Principles and did not seek to join the Purgatoire River Water Conservancy District; instead, it asserted a Compact violation against Colorado. Having chosen not to pursue a claim for failure to comply with the Operating Principles, Kansas is in no position to claim that the Master's ruling allows the Operating Principles to be violated with impunity.

The Master addressed the arguments Kansas made in response to Colorado's motion to dismiss Kansas' Trinidad Reservoir claim at some length. Report at 380-412. Colorado has little to add to the Master's discussion except to note that Kansas had made a similar argument concerning the Winter Water Storage Program. Kansas

contended, based on a resolution adopted by the Compact Administration in 1951, that the Program could not be operated unless an operating plan had been approved by the Compact Administration. In granting Colorado's motion for partial summary judgment on this issue, the Master reviewed the limited powers granted to the Compact Administration in the Compact. *Id.* at 346-50. He stated:

> In its brief, Kansas slips back and forth between two differing statements of its position. At times, Kansas states that the Compact Administration was intended to have the authority to require "submission" of plans for Federal projects; that the Administration wanted "an official say" concerning future plans for the reregulation of native waters, "even if that say was channeled through the governors of Kansas and Colorado." [Citation omitted.] In other places, Kansas states that a right of "approval" was intended. . . .
>
> Clearly there is a difference between merely requiring Federal plans to be submitted to the Administration, and giving that Administration a veto power over the construction or operation of such projects. At best, the historical record suggests that some Compact negotiators wanted, and perhaps expected, that plans for future Federal development would be submitted not only to the affected States, but also to the Compact Administration. *However, the historical record does not support Kansas' claim that the Compact negotiators intended to give the Compact Administration power to control future Federal operations on the Arkansas River.*

Id. at 349-50 (footnote omitted) (emphasis added). Kansas did not take exception to this ruling, and the Master's ruling should be read in conjunction with his decision dismissing Kansas' Trinidad Reservoir claim.

E. Stability and Peaceful Resolution of Controversies Without Litigation Are Enhanced by the Master's Careful Decision on the Limited Powers of the Compact Administration

There is one new argument in Kansas' Brief which calls for a response. Kansas states: "The question involved here is one of principle that will determine for the indefinite future whether Kansas can rely on resolutions of the Arkansas River Compact Administration relating to details of compliance with the Arkansas River Compact." Kansas' Brief at 24. Kansas further states: "The direction that Kansas receives from the Court will also serve as a guide to other states and other interstate compact commissions and administrations." *Id.*

Colorado believes there is a principle at stake in this case, but a different and more important one than stated by Kansas. This Court has frequently urged states to resolve their differences by agreement rather than by invocation of the Court's adjudicatory power. *E.g., Colorado v. Kansas*, 320 U.S. 383, 392 (1943). In the twentieth century, interstate compacts have been widely used as a method to apportion interstate rivers. J. Muys, *Interstate Water Compacts: The Interstate Compact and Federal-Interstate Compact* 8 (National Water Commission Legal Study No. 14) (1971) (Since the Colorado River Compact of 1922, "eighteen additional compacts have been entered into

apportioning the waters of interstate streams."). However, for the most part, states have been cautious about delegating power to interstate agencies created by such compacts. The Arkansas River Compact Administration is typical of a number of interstate agencies which have carefully limited powers and require unanimous consent for action. *Id.* at 14-15, 17 ("Beyond the power to make findings, however, few commissions possess any broader authority."). On occasion, Special Masters appointed by this Court, frustrated by the limited powers of such agencies, have recommended that the Court appoint a tie-breaker to break impasses when the states did not agree, *Texas v. New Mexico*, 462 U.S. 554, 563 (1983), or establish jurisdictional prerequisites and procedural guidelines for application in future interstate compact litigation. *Oklahoma and Texas v. New Mexico*, 501 U.S. 221, 228-29 (1991).

This Court has not followed such recommendations for reasons which are rooted in our federal system. In *Texas v. New Mexico*, the Court said that "unless the compact to which Congress has consented is somehow unconstitutional, no court may order relief inconsistent with its express terms." 462 U.S. at 564. In *Oklahoma and Texas v. New Mexico*, the Court declined to remand an issue to the Canadian River Commission or to establish jurisdictional prerequisites and guidelines because "the Court 'does have a serious responsibility to adjudicate cases where there are actual, existing controversies' between States over the waters of an interstate stream." 501 U.S. at 241, *quoting Arizona v. California*, 373 U.S. 546, 564 (1963).

Considering the number of interstate compacts apportioning interstate rivers, there have been remarkably few cases involving claims for breach of such compacts. However, it would encourage litigation and make states less likely to negotiate such compacts in the future if the Court were to order relief inconsistent with the express terms of a compact or give effect to actions by a compact administration or commission which go beyond the limited powers delegated to such agencies. Many compacts have unanimous consent provisions which would make it difficult to change actions of such agencies.

Stability and peaceful resolution of controversies without litigation are enhanced by decisions, such as the Master's decision granting Colorado's motion to dismiss Kansas' Trinidad Reservoir claim, which give effect to the express terms of the Compact and the limited powers delegated to the Compact Administration.

III. THE SPECIAL MASTER CORRECTLY CONCLUDED THAT KANSAS HAD FAILED TO PROVE ITS WINTER WATER STORAGE PROGRAM CLAIM

Kansas next takes exception to the Master's finding that Kansas failed to prove that operation of the Winter Water Storage Program ("WWSP" or "Program") has violated Article IV-D of the Compact. Kansas' Brief at 26. Kansas argues that the Master erred by placing the risk of uncertainty resulting from the lack of data on Kansas and that he relied on a basis as to which the record was incomplete. *Id.* at 28-34. These arguments are without

merit. The Master's finding was not based on uncertainty resulting from the lack of data and the record was not incomplete with respect to the Master's ruling on the Winter Water Storage Program.

A. Background to the Master's Decision

The Master describes Pueblo Reservoir and the Winter Water Storage Program. Report at 43-44, 306-13. As the Master notes, irrigation during the winter months was a practice which developed in the Arkansas River Valley because of water shortages. *Id.* at 308. Farmers irrigated their lands during the winter to build up moisture in the soil for the growing season. *Id.*; RT Vol. 82 at 153-56 (Helton). Storage of winter flows was first proposed during the planning stages of the Gunnison-Arkansas Project in the late 1940s when the Bureau proposed to add Pueblo Reservoir as a feature of the project. Report at 306.[14]

An interim report describing the Bureau's plans for the Gunnison-Arkansas Project, which included storage of winter flows in Pueblo Reservoir, was provided to the Commissioners who negotiated the Compact. Report at 306; Record of Sixteenth Meeting of the Colorado-Kansas Arkansas River Compact Commission at 16-78 to 16-79 (Jt. Exh. 3) (Colo. Appendix at 1e); Colo. Exh. 643 at 12,

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[14] As the Master notes, winter irrigation below John Martin Reservoir generally ended with the construction of that reservoir and adoption of the Compact. Report at 309. Thus, the Bureau's plans related to storage of winter flows in Pueblo Reservoir for ditches in Colorado between Pueblo Reservoir and John Martin Reservoir.

¶ 51 (June 1948 interim report on the Gunnison-Arkansas Project) (Colo. Appendix at 1f); RT Vol. 11 at 125, 128-36. While the Commissioners did not determine whether the Bureau's plans could be implemented without materially depleting the waters of the Arkansas River, they did not intend to impede or prevent those plans if they could be fit within the framework of the Compact. As Commissioner Gail L. Ireland stated in his testimony to Congress:

> We have also been very careful in this compact to so prepare the same that it would not in any manner prevent proper future development, whatever may be able to be accomplished in the future, on the river. We know that the Bureau of Reclamation has plans, and this compact, in my opinion, does not stand in the way of any of those plans.

Arkansas River Compact: Hearing on S. 1448 Before the Senate Comm. on Interior and Insular Affairs, 81st Cong., 1st Sess. 15 (1949) [hereinafter cited as *Senate Hearing*] (Jt. Exh. 15). *See also* H. Kramer, *Report to the Congress of the United States on the Proposed Arkansas River Compact Between Colorado and Kansas* (1949), *reprinted in Senate Hearing* at 36 (Jt. Exh. 15) ("The above language [of Article IV-D] was evolved from extensive consultation with the affected Federal agencies. It is intended to leave the door open – as it should be – for beneficial development of the Arkansas River Basin in Colorado and Kansas by any and all proper ways and means.").

In 1962, Congress authorized the initial development of the Gunnison-Arkansas Project, which had been renamed the Fryingpan-Arkansas Project to avoid confusion with the larger Gunnison-Arkansas Project. Report at 306-07; Act of Aug. 16, 1962, Pub.L. No. 87-590, 76 Stat.

389 (1962) (Jt. Exh. 168); *Fryingpan-Arkansas Project, Colorado*, H.R. Doc. No. 187, 83d Cong., 1st Sess. 10 (1953) (letter from the Commissioner of Reclamation noting the reason for the name change) [hereinafter cited as "H.R. Doc. No. 187"] (Jt. Exh. 166). Project purposes included the reregulation of "winter flows of the Arkansas River that are presently diverted for direct-flow use but which, by agreement, could be converted to more beneficial summer use through storage in the Pueblo Reservoir." Report at 307 *quoting* H.R. Doc. No. 187 at 32, ¶ 65 (Jt. Exh. 166).

In 1964, the Bureau advised the Southeastern Colorado Water Conservancy District that it should begin to develop a program for storage of winter flows of the Arkansas River in Pueblo Reservoir. Report at 307. In 1965, the Southeastern Colorado Water Conservancy District signed a repayment contract with the United States for the Fryingpan-Arkansas Project which provided for winter storage in project reservoirs and included penalties in the form of increased payments for project water if a winter water storage program was not implemented. *Id.* n. 132.

In 1969 the Southeastern Colorado Water Conservancy District formed a Winter Storage Committee, which included representatives of all entities eligible to participate in the Program. Report at 311. Charles L. ("Tommy") Thomson, general manager of the Southeastern Colorado Water Conservancy District, served as chairman of this committee. *Id.* The initial operating plan for the Winter Water Storage Program was developed by the Southeastern Colorado Water Conservancy District and the participating water users, with assistance from the Bureau, the U.S. Geological Survey ("USGS"), and Colorado water officials. *Id.* at 355. Pueblo Reservoir was

substantially completed in 1975, *id.* at 44, and the first Program began in December of that year. *Id.* at 309, 354.[15] The Program has been operated every year since that time, with the exception of the winter of 1977-78. *Id.* at 309, 354-55.

B. The USGS Did a Study Prior to Implementation of the WWSP, and Studies in 1981 Did Not Indicate Any Adverse Impact on Kansas

Kansas states that Colorado "unilaterally initiated" the Winter Water Storage Program "without the benefit of prior sufficient studies and data collection now found necessary by the Master." Kansas' Brief at 27. This distorts the facts.

The USGS assisted with the planning for the Program and did a study prior to implementation of the Program which concluded that Stateline flows would increase. Report at 313, 355. Mr. Thomson appeared at several Arkansas River Compact Administration meetings from 1970 to 1975 to discuss planning for the Program. *Id.* at 311, 356. At the December 1975 meeting of the Compact Administration, Mr. Thomson informed the Compact Administration that the Program had begun on a three-month experimental basis. *Id.* at 311. The Compact Administration was complimentary and adopted a resolution directing its Special Engineering Committee to review

[15] The Master states that the Program commenced in 1976. Report at 309. The Program actually began in December 1975; however, witnesses frequently used the term "Compact Year," which begins on November 1 of the preceding year. Thus, the Master's statement is correct if it is understood to mean that the Program began in Compact Year 1976.

operations of the Fryingpan-Arkansas Project and to report to the Compact Administration each year on the relationship between the Project and the Compact. *Id.* at 312, 356. Mr. Thomson was also requested to appear at the next meeting of the Compact Administration to report on the results of the Program, which he did in May 1976. *Id.* at 356.

In December 1980, Kansas expressed a concern over potential reduction of inflow into John Martin Reservoir resulting from the Program. Report at 312. The Kansas representatives to the Compact Administration suggested that a study be made, which was done by the USGS and completed in February 1981. *Id.* at 312-13; Colo. Exh. 538. The USGS performed an analysis of streamflow records and concluded that the data did not indicate that inflow to John Martin Reservoir had been reduced as the result of the Program. Report at 313; Colo. Exh. 538 at 3. The Kansas Division of Water Resources also did a comparison of streamflow records and concluded that the comparison indicated that there had not been a reduced flow since operation of Pueblo Reservoir began. Report at 313; Colo. Exh. 539. "Thus," as the Master states, "the early and preliminary reviews of winter storage did not indicate any adverse impact upon Kansas, . . . " Report at 313.

In 1981, however, Howard C. Corrigan, the Kansas Water Commissioner, discovered a resolution which had been passed by the Compact Administration in 1951. Colo. Exh. 21 at 149 (deposition of Howard C. Corrigan); Colo. Exh. 17 at 98 (deposition of Carl Bentrup). Based on the resolution, Kansas began to insist that the Program had to be approved by the Compact Administration. In 1985, Kansas requested an investigation of the Program

by the Compact Administration, but its insistence that the Program had to be approved by the Compact Administration impeded the investigation. Report at 364 ("It is evident that any earlier action by the Compact Administration concerning the winter storage program was at least impeded, and perhaps blocked, by the legal disagreement between the States over the 1951 Resolution."). Colorado moved to stay Kansas' WWSP claim to allow the Compact Administration an opportunity to investigate the claim, but Kansas opposed the motion and the Master denied Colorado's motion to stay. *Id.* 364-67.

Thus, the Program was not initiated without prior studies, and preliminary studies by the USGS and the Kansas Division of Water Resources did not show any adverse impact on Kansas from the Program. Moreover, Kansas had known about the Program since 1970, was kept well-informed about the Program thereafter, and did not raise any objection to the initiation of the Program in 1975. Report at 311-12. Nor did Kansas complain about lack of data or ask the Compact Administration to make an investigation to collect any missing data or make any findings of fact relating to the Program.

Furthermore, the Master gave Kansas every opportunity to present evidence to support its claim, granting Kansas' motion for a seven-month continuance to replace Mr. Durbin[16] after cross-examination had brought out a

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[16] Timothy J. Durbin, a former District Chief for the California District of the USGS, was the chief technical expert witness for Kansas. Report at 228. He developed the basic structure of the H-I Model and the usable flow method which Kansas originally relied upon to quantify its claims. *Id.* at 230, 235, 293-94.

serious coding error in the original H-I Model concerning the Program. Report at 28, 236-37, 315. The Master also allowed the Kansas replacement experts, over objection by Colorado, to make changes in the way the Program was represented in the model, not to correct errors in the model, but to better represent the Program. RT Vol. 88 at 29, 31-32; RT Vol. 91 at 44-50 (Book) (describing changes).[17] Having failed to prove its claim, Kansas now argues that the burden of uncertainty from the lack of data should fall on Colorado. Kansas' Brief at 29-32. In making this argument, Kansas implies that the Master's decision was based on the uncertainty in the Kansas' modeling analysis due to the lack of adequate data. Kansas' Brief at 29 ("Much of the source of the uncertainty in the WWSP analysis is the lack of adequate data."). The Master did discuss the lack of data on winter evaporation rates, but that was not the basis for his decision.

C. Summary of the Master's Decision and Reasons for Concluding that Kansas Had Not Proved the WWSP Had Caused Material Depletions to Usable Flows

In his Report, the Master reviewed the evidence presented by the parties concerning the Winter Water Storage Program and concluded that, even applying the preponderance of the evidence standard, Kansas had not proved that the Program had caused material depletions in violation of the Compact. Report at 335. The Master states:

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[17] The Kansas replacement experts also made many other changes to the H-I Model. Report at 245.

> Kansas' case has not been helped by its own contradictions in quantifying impacts to usable flow – ranging during this trial from 255,000 acre-feet initially, to 44,000, to 40,000; nor by the fact that depletions are essentially eliminated if accretions are taken into account. This is not to say that the WWSP has not adversely impacted Stateline flows, but rather that Kansas has failed to prove that it has.

Id. at 335; *see also id.* at 236 ("The major changes in Kansas' position and evidence cannot be ignored."), 315 ("In evaluating the overall persuasiveness of the Kansas case, this original evidence cannot be forgotten or ignored."). The Master then recommends "that the Court find that Kansas has failed to prove that operation of the program has violated the compact." *Id.* at 336.

Kansas takes exception to the Master's recommendation, contending that he recommended that its claim be denied because "(1) it is too uncertain; and (2) accretions might offset depletions." Kansas' Brief at 26. Kansas argues that its experts "determined there was a violation in the amount of 40,000 acre-feet of depletions to usable flow during the operation of the program (1976-85)." *Id.* Kansas states: "No other evidence of depletions or lack thereof was submitted for the 1976-85 period of operation," *id.*, and that "[t]he Master rejected the evidence of depletions, however, holding that the results are too uncertain, placing the onus of uncertainty on Kansas. . . ." *Id.* at 27. Kansas again misstates the facts and the basis of the Master's recommendation.

First, as the Master noted, Kansas was not helped by its experts' calculations of progressively less and less

depletions to usable Stateline flows for the 1976-85 period as errors in the H-I Model were discovered and corrected. Report at 335. Kansas' experts first asserted that the Program had depleted usable Stateline flows in the amount of 255,000 acre-feet. Report at 315; Kan. Exh. 112* (12-6-90) (Comparison H). However, this estimate was based, at least in part, on a serious coding error in which several lines of code had been left out in one of the "runs" of the model. Report at 238; RT Vol. 87 at 54-55, 67 (Schroeder).[18] This error was brought out during cross-examination of Mr. Durbin. Report at 28; RT Vol. 51 at 114-40. Dewayne R. Schroeder, Colorado's modeling expert, then identified sixteen coding errors and poor assumptions in the model during his testimony. Report at 238; RT Vol. 87 at 53-68.

After correcting errors and poor assumptions in the original H-I Model pointed out by Mr. Schroeder, Kansas' replacement experts presented a new estimate of depletions of 44,000 acre-feet. Report at 238, 245, 315. Even that estimate was based on an error in the revised model. *Id.* at 315. When that error was identified and corrected, the final estimate of depletions to usable Stateline flows dropped to 40,000 acre-feet. *Id.* at 315-16. However, this estimate was based on a new usable flow method developed by the Kansas replacement experts which the Master concluded was not appropriate for use with the H-I Model. *Id.* at 322. Using the usable flow method developed by Mr. Durbin, which the Master found was the best

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[18] When that error was corrected, the original H-I Model predicted that usable Stateline flows would increase by 18,800 acre-feet. RT Vol. 87 at 54, 78, 81 (Schroeder).

of the methods presented, depletions were reduced to 27,200 acre-feet. *Id.* And when accretions (increases in flows) predicted by the model from the Program were taken into account, these depletions were eliminated. *Id.* Thus, the 40,000 acre-foot figure was not the only evidence of depletions to usable Stateline flows or lack thereof submitted for the 1976-85 period of operation. It was simply the final estimate presented by Kansas to quantify its claim.

Second, the Master did not reject Kansas' claim because lack of data made the results too uncertain. Rather, he concluded that the depletions predicted by the H-I Model were not reliable and could not be considered apart from the accretions predicted by the model. Report at 327-29.

As the Master notes, both the United States and Colorado argued that accretions must be considered when evaluating the impacts of the Program. Report at 327. When accretions were taken into account using the Durbin usable flow method, "the revised H-I Model reduces depletions to 2,200 acre-feet for the whole nine-year program, or calculates an actual increase in Stateline flows, depending on how the institutional switches are set for the 1980 Operating Plan." *Id.* at 327-28, *citing* Colo. Exh. 975, Comparisons 3, 7.[19] Kansas objected to considering the accretions to usable Stateline flows because

[19] The increase in usable Stateline flows predicted by the revised H-I Model was 2,800 acre-feet. Colo. Exh. 975, Comparison 3. This was the comparison the Kansas replacement experts relied upon to determine impacts from the Winter Water Storage Program with the revised H-I Model, Report at 316, but the Master questioned the comparison because it involved two

31,000 acre-feet of the 37,000 acre-feet of accretions to usable Stateline flows predicted by the model during the 1976-85 period had occurred in two months in 1985, right at the end of the period. Report at 328. However, as the Master notes, the timing of accretions and depletions predicted by the model was a product of the assumptions and parameters used in the modeling effort, and it seemed likely that a reservoir storage program could well provide some usable accretions that would mitigate depletions. *Id.*

The Master then noted that the evidence showed that, without regard to other criticisms about the model by the United States and Colorado, "in seven of the nine years during which the WWSP operated, the H-I model put more water into storage in John Martin Reservoir than actually occurred." Report at 328. "As a result of this artificial buildup," he stated, "the model calculated that John Martin Reservoir filled in 1985, finally producing a model spill of 255,000 acre-feet." *Id.* He noted that a spill did occur in 1985, but it was only 87,000 acre-feet. *Id.* The United States and Colorado argued that, when it simulated the operation of the Program, the H-I Model thus held water in storage that in reality flowed downstream to add to Stateline flows (and thereby would have eliminated the depletions predicted by the model); however, in

hypothetical model runs, neither of which actually happened. *Id.* at 259-60. When the "switches" for the 1980 Plan were left on in both model runs, it changed the results from a slight accretion to a slight depletion of 2,200 acre-feet over the nine-year period; but, as the Master concluded, these depletions are well within the range of error of the model. *Id.* at 334-35.

terms of model results, the water showed up as accretions when the stored water was spilled in two months in 1985. *Id.* The Master noted that Kansas disregarded such accretions as not being usable or timely. *Id.* The Master concluded:

> There is not sufficient evidence to determine what the impact on Stateline flows would have been if the H-I Model had more closely corresponded to actual storage in John Martin and to actual releases. However, there seems to be merit in Colorado's argument, with respect to the WWSP and accretions, that the H-I Model has created "false depletions." [Citation omitted.]

Id. at 328-29.

The Master then discussed the disagreement over the proper method to calculate winter evaporation rates, but concluded:

> In the final analysis, modeling winter evaporation depends not only upon the equation used but also on the amounts and frequency of the irrigation applications, and weather conditions at those times. *However, that determination need not be made in order to decide the present WWSP claim.* I have concluded that the depletions shown by the Kansas model are well within the model's range of error. One cannot be sure whether impact or error is being shown.

Report at 334-35 (emphasis added). Thus, the Master's conclusion was not based on the uncertainty due to lack of data on winter evaporation rates; it was based on a finding that Kansas had not proved material depletions to usable Stateline flows because the depletions predicted

by the model were not a reliable basis to determine the impact of the Program.

Third, the record was not incomplete on this issue. *See* Kansas' Brief at 33-34. The Master did state, with respect to accretions predicted by the revised H-I Model in the comparison used to evaluate the impact of post-compact well pumping, that the issue needed to be examined. Report at 263. However, he specifically stated:

> This conclusion relates *only to postcompact pumping* in Colorado, and *not to the Winter Water Storage Program*. The impact, if any, of that program is discussed in Section XXII hereof.

Id. (emphasis added). In the case of Kansas' WWSP claim, there was considerable evidence presented about the accretions predicted by the revised H-I Model. *Id.* at 327-29. The fact that the Master concluded that further evidence was necessary about accretions predicted by the revised H-I Model in a different comparison does not mean that his conclusion on the Winter Water Storage Program needed to await such evidence.[20]

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[20] Furthermore, there were many other criticisms of the two model runs used to evaluate the Program with the revised H-I Model which the Master did not bother to address. Report at 326-27 & n. 144. For example, the model overpredicted the amount of water actually put into storage by about 141,500 acre-feet. *Id.* at 327. Colorado's expert, Duane D. Helton, testified that the overprediction of diversions to off-channel storage had biased the results of the model. RT Vol. 134 at 52-59.

D. Colorado's Evidence Did Not Show Depletions to Usable Flows

Kansas states that Colorado analyzed the Winter Water Storage Program using a different period and "[y]et even with several favorable assumptions, Colorado also found depletions of total flow, in excess of 9,000 acre-feet." Kansas' Brief at 26-27. Kansas misrepresents the results of Colorado's analysis.

The Colorado analysis was done by superimposing the current operating plan for the Program on the period 1950-75 and 1978, the years when the Program did not operate. Report at 317; RT Vol. 83 at 96-98 (Helton).[21]

The Colorado analysis predicted that conservation storage in John Martin Reservoir would *increase* by an average of 244 acre-feet per year. RT Vol. 83 at 145-46 (Helton); Colo. Exh. 134*, p. 8.1, col. (13). The Colorado analysis also predicted that Stateline flow during the summer, April through October, would not change, *id.*, col. (15), and during the winter, November through March, would decrease by an average of 354 acre-feet per year. *Id.*, col. (14). However, this was a depletion to *total*, not *usable* Stateline flow, and does not include the increases in Stateline flow that would have occurred as a result of the increase in conservation storage.

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[21] Colorado's expert, Mr. Helton, did not believe it was possible to predict reliably what the diversions would have been if the Program had not been operated because diversions during the period when winter irrigation had been practiced varied due to climatic conditions and the need to do maintenance on canals. RT Vol. 83 at 98-104, 107-08.

Mr. Helton concluded that the Kansas irrigators did not rely on wintertime flows because of poor water quality and icing problems. RT Vol. 83 at 63, 146. Therefore, he concluded that the small depletions predicted during the period November through March would not deplete usable Stateline flows. *Id.* at 63. The average depletion of 354 acre-feet per year can be put into perspective by comparing it to the average of 48,000 acre-feet *per year* of unused flow passing Garden City which the Bureau had estimated was available for development after the Compact became effective. *See* Colorado's Brief in Support of Exceptions at 6 n. 6; Colo. Exh. 112 at 3-4, 6.

Mr. Helton assumed that Kansas would receive 40 percent of the increase in conservation storage. Thus, he concluded that the *potential* impact of the Program on Kansas would be to increase Stateline flow by an average of 97 acre-feet per year. Colo. Exh. 134*, p. 8.1, col. (17); RT Vol. 83 at 146. Mr. Helton then went on to do a monthly analysis of the impacts of the predicted changes from the Program on usable Stateline flow, which showed that *usable* Stateline flows would have *increased* by an average of 196 acre-feet per year if the Program had been in effect during the period 1950-69. Colo. Exh. 134*, p. 9.3, col. (11); RT Vol. 86 at 80, 85-88 (Helton). Thus, Mr. Helton concluded that there was no discernable impact on either conservation storage or usable Stateline flows from the Program. RT Vol. 83 at 105-06; Vol. 86 at 87-88.

Kansas argued strenuously that the Colorado analysis was not relevant to address its claim because it was for the wrong period. Report at 317. The Master stated that he could not say that it was "legally wrong" to analyze the impact of the Program in this manner, but

concluded that it was "more appropriate" to evaluate the operations of the Program during the period it actually operated. *Id.* at 317-18. Thus, he did not rely on the Colorado analysis as the basis for his finding that Kansas had failed to prove its claim. *Id.* at 318. The Master did mention in passing that the Colorado analysis does show some limited depletions, "in excess of 9,000 acre-feet for the 27 year period studied, or about 354 acre-feet per year on average." *Id.* However, as noted above, these depletions were not depletions to usable Stateline flows and did not include the increases in conservation storage or usable Stateline flows predicted by the Colorado analysis.[22]

Kansas claims that the Colorado analysis was based on several favorable assumptions, Kansas' Brief at 30, but never demonstrated that changing assumptions in the Colorado analysis would change the results. Instead, Kansas relied on the results of the revised H-I Model because it insisted that Colorado analyzed the wrong period. *Id.*

E. The Master's Decision Was Not Based on a Finding That the 53,000 Acre-Feet of Depletions Predicted by the Revised H-I Model Were Negligible

Kansas contends that with regard to its WWSP claim, the Master concluded the 53,000 acre-feet of depletions

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[22] The Master stated that he found no specific testimony on this point. Report at 318. Mr. Helton's testimony on the impact of the Program on usable flows occurred several days after he described his analysis of the Program but is in the record. RT Vol. 86 at 80-88.

shown by the Kansas H-I Model are well within the model's range of error. Kansas' Brief at 28. Kansas then proceeds to argue that depletions of that magnitude are not negligible, *id.*, and that Colorado should have "the burden of coming forward with evidence to reduce assumed uncertainty in the Kansas evidence of depletions." *Id.* at 32.

This argument is predicated on a misconception of the Master's ruling. The Master concluded that, when accretions were taken into account, the revised H-I Model calculated depletions to usable Stateline flows of just 2,200 acre-feet for the period 1976-85 or calculated an increase in usable Stateline flows depending on how the institutional "switches" were set for the 1980 Operating Plan. Report at 327-28. He further concluded that the model did not accurately represent storage in and releases from John Martin Reservoir and, therefore, that the depletions predicted by the model were not a reliable basis to determine the impact of the Program without taking into account the accretions predicted by the model. *Id.* at 334-35. It was in that context that the Master concluded that the depletions shown by the revised H-I Model are well within the model's range of error.

Kansas also states that "the attempts by the Colorado expert to alter the Kansas model to eliminate calculated depletions did not succeed." Kansas' Brief at 32. This misrepresents Mr. Schroeder's testimony. Mr. Schroeder was highly critical of the way in which the Kansas replacement experts had calibrated the revised H-I Model. Report at 247; RT Vol. 138 at 83-88, 98. Mr. Schroeder restored the canal capacities and removed the diversion reduction factors and made other changes to the H-I

Model in order to demonstrate that the model could be calibrated without resort to such steps. Report at 288; RT Vol. 138 at 100, 105, 137. However, he believed that there were deep-rooted problems with the model, RT Vol. 112 at 43-44; Vol. 138 at 138-40, and did not offer the results as an appropriate quantification of Kansas' claims. Report at 247, 288-89. Specifically, with regard to the Winter Water Storage Program, he testified that he had not revised the parameters used in the model to predict diversions under the Program and did not believe the results of his version of the H-I Model were appropriate to evaluate the Program. RT Vol. 139 at 34.[23]

F. The Master Decision Was Not Based on Uncertainty Due to the Lack of Data

Kansas asserts: "None of the experts deny that there is uncertainty with respect to the modeling results of either state," and that "[m]uch of the source of the uncertainty in the WWSP analysis is the lack of adequate data." Kansas' Brief at 29. From this premise, Kansas then argues that "[t]he risk of the lack of adequate data should be borne by the state that initiates and benefits from post-Compact development without collecting the data within its jurisdiction or doing the studies needed to support a good faith belief that the development will comply with the Compact." *Id.* Further, Kansas asserts that "Colorado, as a practical matter, has had control over (1) existing

[23] Diversions under the Program are predicted based on calibrated parameters. RT Vol. 128 at 96 (Larson). Mr. Schroeder did not attempt to recalibrate those parameters when he made his changes to the model. RT Vol. 139 at 34.

data in Colorado and (2) the determination whether to collect additional data that may be needed." *Id.* Kansas then argues that "because of Colorado's lack of data collection during the study period, Kansas has been blocked by the Master on the basis that there is too much uncertainty in its evidence." *Id.* at 29-30. Kansas therefore argues that the burden of proof or, at least, "the burden of production of data" should have been on Colorado. *Id.* at 30.

First of all, Kansas has failed to identify any additional data which Colorado failed to collect and which would have reduced the uncertainty in the Kansas modeling analysis. There was disagreement about the proper methodology to calculate winter evaporation rates, but the results of the revised H-I Model were based on the methodology adopted by the Kansas experts. Report at 330-31.

Second, Kansas' argument is inconsistent with the Arkansas River Compact. The Compact provides that the Compact Administration shall promptly investigate violation of any of the provisions of the Compact. Arkansas River Compact, Art. VIII-H. The Compact further provides that the Administration shall cooperate in the procurement, interchange, compilation, and publication of all factual data bearing upon the administration of the Compact and that state officials "shall furnish pertinent factual data to the Administration upon request." *Id.*, Art. VIII-G(1). Thus, the fact that Colorado may have had control over existing data in Colorado is not an impediment to obtaining such data under the Compact. Likewise, the fact that the Compact Administration requires

unanimous action was not shown to be a problem in obtaining data in this case.

Third, the Master's decision was not based on a finding that the uncertainty in the Kansas analysis of the Program was due to the lack of adequate data. It was based on the fact that the model did not accurately represent storage in and releases from John Martin Reservoir. Report at 328-29.

Finally, the cases cited by Kansas do not support shifting the burden of proof to Colorado or placing the burden of production of data on Colorado. The cases cited by Kansas involve the doctrine of *res ipsa loquitur*, *e.g.*, *Ybarra v. Spangard*, 25 Cal.2d 486, 154 P.2d 687, 689 (1944),[24] or other unique situations where a loss has occurred and the facts are peculiarly within the knowledge of the defendant. *E.g.*, *Commercial Molasses Corp. v. New York Tank Barge Corp.*, 314 U.S. 104, 111 (1941) (bailment). These cases do not support the proposition that the burden of proof or the burden of coming forward with evidence shifts to the defendant anytime the defendant has control over access to certain facts. 2 McCormick on Evidence § 337 at 429 (4th ed. J.W. Strong 1992). Otherwise, the burden of proof and the burden of coming forward with evidence would shift to the defendant in virtually every case. Discovery is the usual method by which a plaintiff obtains facts within the possession of a

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[24] *Ybarra v. Spangard* applied the doctrine of *res ipsa loquitur* in a case where a patient entered a hospital for an appendectomy and, after the operation, developed atrophy of the muscles around the shoulder. These are not, as Kansas asserts, "comparable circumstances." Kansas' Brief at 31.

defendant. Moreover, in this case, the Compact provided a method to obtain data and conduct investigations in the State of Colorado prior to the initiation of this litigation. Arkansas River Compact, Art. VIII-G(1), -H; *see* Colo. Exh. 61 (Report on stock ponds in Colorado prepared by the Engineering Committee of the Compact Administration).

G. Other Arguments by Kansas Are Without Merit

Kansas states: "Common sense leads to the conclusion that putting water on the fields in the heat of summer results in more evaporation and other losses than irrigating fields without crops in the cold of winter." Kansas' Brief at 27. If that were true, one would question why Kansas allowed the Program to begin without objection and why Kansas' experts spent five years to develop the H-I Model to support its claim. The Master noted that the issue is not as simple as Kansas suggests, but is an issue on which testimony by experts is necessary:

> Kansas maintains that storing the winter river flows in reservoirs, and then applying that water to irrigated crops in the summer, uses more water than simply irrigating bare fields in the winter. On first impression, this would seem to be true. . . . However, the issue is much more complex than first appears, and a great deal of highly technical evidence was introduced on the subject. The issue turns largely on the amount of evaporation from bare soil that is assumed during the period when winter irrigation was practiced.

Report at 329.

Kansas also argues that the Master, attempting to apply the preponderance test, in effect "said that it was more likely than not that there were no material depletions of usable flow as a result of the WWSP," Kansas' Brief at 28, a result which Kansas says is "inherently implausible." *Id.* The Master did not conclude that it was more likely than not that there were no material depletions of usable flow; rather, he concluded that, even applying the mere preponderance of the evidence test, Kansas had not proved that the Program had caused material depletions of usable flows in violation of the Compact. Report at 335.

IV. THE MASTER CORRECTLY CONCLUDED THAT THE SPRONK USABLE FLOW METHOD WAS NOT APPROPRIATE TO USE WITH THE H-I MODEL

Finally, Kansas takes exception to the Master's conclusion that the Durbin approach was the best method presented for determining depletions to usable flow. Kansas' Brief at 35-44. Kansas states: "The Master's usable flow method would reduce Kansas' claim by 124,000 acre-feet (25%)." *Id.* at 9. Kansas asserts that the method it proposed, the Spronk method, is the only method consistent with the Compact. *Id.* at 35, 40.

Reading Kansas' Brief, one would never know that the method which the Master concluded was the most appropriate for use with the H-I Model was in fact developed by its own expert, Mr. Durbin, *and originally presented by Kansas to quantify its claim*. Report at 235; RT Vol. 45 at 124-25. The Kansas replacement experts developed a

new usable flow method, but Colorado's experts testified that the new method was not appropriate for use with the H-I Model, and the Master agreed. Report at 303. Thus, the "Master's usable flow method" is nothing more than the usable flow method developed by Mr. Durbin for use with the H-I Model.

During the continuance which the Master granted to allow Kansas to replace Mr. Durbin with other experts due to his hospitalization, Report at 241, the Kansas replacement experts not only modified the coefficients used in the Durbin usable flow method, *id.* at 294-95, but also developed a new usable flow method based on a daily analysis of flows used in Kansas (the "Spronk method"). *Id.* at 300.[25] Colorado's experts objected to the

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[25] Colorado objected vehemently to allowing the replacement experts to use the continuance to redo Kansas' case in this fashion, which was contrary to the order granting the continuance. RT Vol. 88 at 35-38, 40-47; *see* Order Re Kansas Motion for Continuance (Mar. 27, 1991), *printed in* Report-App. at 92 ("This continuance is not granted to allow Kansas, as Colorado fears, 'to redo its case'. . . . Rather, it is intended only to allow Kansas to complete its case, and in particular, to remedy the errors in the model and other exhibits that were identified during cross-examination."). The Master acknowledged that "there was some merit in Colorado's reaction, but in the last analysis I concluded that it was more important to have the best evidence available in the record." Report at 241; RT Vol. 88 at 32. He therefore denied Colorado's motion to exclude the Spronk method and other changes made by the replacement experts to improve Kansas' case. Report at 241. He sought to remedy any prejudice to Colorado by giving Colorado time to prepare cross-examination and to respond to the new evidence as part of its surrebuttal case. *Id.* Because of the lengthy continuance and rulings such as this which were made throughout the trial, giving Kansas the right to present new evidence and new exhibits, Colorado

accuracy of the reconstructed records of flow at Garden City for the 1970-85 period used in the Spronk analysis, *id.*, and to the failure to factor out increased depletions to the flow at Garden City due to post-compact well pumping in Kansas in the 1970s. *Id.* at 304. The Master concluded that the reconstructed records of flow at Garden City were "probably sufficient" for the purpose for which they were used, but agreed that the analysis had not factored out the increased losses in the Arkansas River in Kansas due to increased well development in Kansas. *Id.* at 227, 301, 304-05.[26]

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believes the "clear and convincing" standard should apply to Kansas' claims even if the Court concludes the preponderance standard would otherwise apply to a case for breach of a compact. It is simply not fair to a defendant state, or consistent with the equality of right among states, to allow a plaintiff state to take advantage of the liberal rules allowing full development of the facts in cases between states and then apply a mere preponderance standard. *See* Brief in Support of Colorado's Exceptions at 98 n. 64.

[26] Kansas tries to deflect the Master's finding on this issue by saying that Colorado never established that this concern actually caused the method to give unreasonable results. Kansas' Brief at 43. Kansas states: "It is simply a possibility." *Id.* This is not correct. Mr. Helton demonstrated that the Spronk method over-estimated depletions to usable flows after 1970 because of the increased losses in Kansas. RT Vol. 114 at 186-94; Vol. 115 at 20-22. Kansas also states that "Colorado's counterclaim based on the same allegation of increased pumping, was dismissed by the Master for the reason that Colorado had not proved its case." Kansas' Brief at 43. The Master granted Kansas' motion to dismiss Colorado's counterclaim because Colorado had not shown a "tie-in" between the increased losses in Kansas and any injury to Colorado, not because Colorado had failed to prove the increased losses in Kansas. Report at 454-57.

Colorado's experts also testified that the Spronk method was not appropriate for use with the results of the revised H-I Model because the model was not accurate except on a long-term basis. Report at 303. The Master agreed. *Id.*

Kansas argues, however, that the Durbin method underestimates depletions to usable flow during the period 1975-82. Kansas' Brief at 35. This conclusion does not necessarily follow. The Durbin method calculates depletions to usable flows which are less than the Spronk method during that period, but one cannot conclude from that fact alone that the Durbin method underestimates depletions. One could just as easily conclude that the Spronk method overestimates depletions to usable Stateline flow during that period. Since the monthly percentages used in the Spronk method vary from 0 to 100% depending on a daily analysis of whether the flow crossing the Stateline was being fully used in Kansas, Report at 301-02, it is only appropriate to use that method if the model can predict changes in Stateline flows accurately on a monthly basis. *Id.* at 303. Because the results of the H-I Model are not accurate on that time scale, it is simply not appropriate or reasonable to use that method with the results of the H-I Model. *Id.* at 303-05.

Kansas argues, however, that the Durbin method underpredicts depletions during the 1975-82 period when most flows would have been usable. Kansas' Brief at 40-41. The Master, who heard extensive testimony about the H-I Model and the inaccuracy of the model on a monthly and an annual basis, Report at 303, rejected this argument:

Kansas argues that applying long-term averages, as Durbin did, underestimates the depletions of usable flow during the late 1970s and early 1980s. That was a period of drought, and according to Kansas most of the low flows were usable. The Spronk analysis was said to correct this inequity. Kansas states that the Spronk methodology gives substantially the same results as the Durbin analysis, except from approximately 1975 to 1982 when the Spronk analysis more properly represents actual hydrologic conditions. . . . However, as Colorado points out, virtually the entire H-I Model is based on average data. . . .

Colorado acknowledges that in theory, at least, there is some validity to the daily approach used by Spronk. . . . However, the Colorado experts testified that the Spronk usable flow method was not appropriate for use with the revised H-I Model. The Spronk analysis assumes that the H-I Model can accurately predict changes of Stateline flow on a monthly basis. RT Vol. 110 at 126-27; RT Vol. 111 at 32, 38-39, 128-29; RT Vol. 115 at 23-24. I believe the objection is sound.

Id. at 302-03 (footnote omitted).

Kansas argued then, as it does now, that the period 1975-82 was a dry period when most of the flow was usable; however, as the Master points out, this argument presumes that the model can accurately predict changes in Stateline flows during this period:

> As the United States notes, the fact that virtually all flows during a dry period may be usable does not "carry this argument." RT Vol. 142 at 48. The more fundamental question is what the Stateline flows and depletions were before usability criteria were applied.

Report at 302 n. 129.[27]

The Kansas replacement experts corrected errors and poor assumptions in the original H-I Model, but did not change the basic logic or structure of the model. As the Master states:

> Although the H-I Model was improved by Kansas' replacement experts, the fundamental structure of the model was not changed. Durbin's testimony shows that the model was originally designed to predict changes in Stateline flows. In his opinion, the model was a "good predictor" when "looking at long periods of time." RT Vol. 51 at 72. Using "a long-term average," he testified that the model predicted actual Stateline flows with a "fair degree of accuracy." *Id.* at 84. If multi-year periods were averaged, Durbin said "there would begin to be more and more correspondence between the model and what was actually observed." RT Vol. 44 at 86.

Report at 303 n. 130. Mr. Schroeder, Colorado's modeling expert, testified at length as to why the revised H-I Model could not accurately predict changes in Stateline flow on a monthly or an annual basis, one reason being that

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[27] The Master describes some of the extensive testimony and evidence on the inaccuracy of the revised H-I Model. Report at 303-04. If the Court has any question about the Master's findings on this issue, we urge the Court to examine the exhibits and the testimony cited by the Master. For a comparison of the actual, observed Stateline flows and the Stateline flows predicted by the revised H-I Model, see Colo. Exh. 908.

Kansas' demands for releases from John Martin Reservoir are predicted on the basis of calibrated numbers that do not vary from year to year and do not take into account weather or crop conditions in Kansas. Report at 263 n. 102; RT Vol. 111 at 23-39.

Kansas' argument that the "plain meaning" of Article IV-D "excludes the notion of averaging over multi-year periods," Kansas' Brief at 38, if correct, is fatal to its entire case. The H-I Model was not designed to be accurate on a daily or monthly basis and relied on averages. Report at 303 n. 130. Kansas states that "this court and the compacting states have recognized the need to assess the usability of flows on a daily basis to the maximum extent possible." Kansas' Brief at 39. If that is correct, then it follows that *depletions* to usable flows should have been assessed on a daily basis to the maximum extent possible. As Colorado demonstrated, and as the Master found, the H-I Model was based on averages and could not accurately predict changes of Stateline flow on a monthly or annual basis. Report at 302-03. The structure of the model, and the data used in the model, were such that it was only a good predictor looking at long periods of time. *Id.* at 303 n. 130. Therefore, if Article IV-D excludes the notion of averaging, Kansas' claims should be dismissed on that basis.

Finally, the very premise of Kansas' argument ignores the fact that John Martin Reservoir regulates the water supply for ditches in Kansas. Thus, the importance of daily usability expressed in *Colorado v. Kansas*, 320 U.S. at 396-98, has been significantly lessened for water users in Kansas because John Martin captures flood flows and regulates the water supply for ditches in Kansas when

there is water in the conservation pool. In addition, virtually all of the farmers under ditches in Kansas who use surface water also use wells to supplement surface supplies. Jt. Exh. 105 at 112, 130. If Stateline flows are reduced, water users in Kansas simply pump additional water. If Stateline flows are then increased, they pump less water. Thus, the concern about daily usability expressed in *Colorado v. Kansas*, 320 U.S. at 396-98, has been significantly reduced for water users in Kansas with construction of John Martin Reservoir and the use of wells to supplement surface supplies.

V. CONCLUSION

Kansas' exceptions to the Special Master's Report should be denied:

1. The Master correctly concluded that Kansas' evidence did not prove that the operation of the Trinidad Project had violated the Compact.

2. The Master correctly concluded that Kansas had failed to prove that the operation of the Winter Water Storage Program had violated the Compact.

3. The Master correctly concluded that the Spronk usable flow method was not appropriate for use with the results of the H-I Model.

Respectfully submitted,

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No. 105, Original

In The

Supreme Court of the United States

October Term, 1985

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

UNITED STATES OF AMERICA,

Defendant-Intervenor.

APPENDIX TO COLORADO'S REPLY BRIEF

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Appendix Item 1

Excerpt from Transcript of Proceedings Held Before
Arthur L. Littleworth, Special Master, pages 39-40

September 28, 1988

MR. SIMMS:

* * *

WE BELIEVE THAT THAT ROLLOVER CONTRAVENES BOTH THE OPERATING STUDIES, THE OPERATING PRINCIPLES, THE MODEL TRANSFER DECREE, CONDITION THREE OF THE KANSAS AMENDMENTS TO THE OPERATING PRINCIPLES AS WELL AS THE ARKANSAS RIVER COMPACT.

SPECIAL MASTER: NOW, LET ME JUST STOP YOU THERE FOR A SECOND.

IT CAN VIOLATE ALL OF THOSE THINGS THAT YOU HAVE SAID BUT YOUR COMPLAINT IN THIS CASE IS THAT THIS IS ONE OF THE THINGS THAT ULTIMATELY RESULTED IN A MATERIAL DEPLETION OF THE STATE LINE. SO THAT IS – WHEN YOU FINALLY GET DOWN TO WHAT YOU HAVE GOT TO SHOW, WHETHER OR NOT IT IS IN ACCORD WITH THESE VARIOUS THINGS IS NOT REALLY WITHIN YOUR COMPLAINT, IS IT? ARE WE STILL LOOKING AT WHETHER OR NOT THERE HAS BEEN A MATERIAL DEPLETION CAUSED BY THOSE OPERATIONS?

MR. SIMMS: THAT IS THE ULTIMATE PROBLEM. I THINK WHETHER OR NOT IT VIOLATES ALL OF THE OTHER ITEMS THAT I MENTIONED HAS A BEARING ON THE LEGAL RESOLUTION OF THAT PROBLEM. BUT AS A MATTER OF FACT –

SPECIAL MASTER: YOU HAVEN'T PLEAD A CASE WHICH HAS ASKED ME TO DETERMINE WHETHER OR NOT IT HAS VIOLATED A WHOLE LOT OF OTHER EARLIER DECREES; IS THAT RIGHT?

MR. SIMMS: THAT IS CORRECT.

Appendix Item 2

Section 1(a)-(c) of the Flood Control Act of 1944
33 U.S.C. §701-1 (1988)

§ 701-1. Declaration of policy of 1944 Act

In connection with the exercise of jurisdiction over the rivers of the Nation through the construction of works of improvement, for navigation or flood control, as herein authorized, it is hereby declared to be the policy of the Congress to recognize the interests and rights of the States in determining the development of the watersheds within their borders and likewise their interests and rights in water utilization and control, as herein authorized to preserve and protect to the fullest possible extent established and potential uses, for all purposes, of the waters of the Nation's rivers; to facilitate the consideration of projects on a basis of comprehensive and coordinated development; and to limit the authorization and construction of navigation works to those in which a substantial benefit to navigation will be realized therefrom and which can be operated consistently with appropriate and economic use of the waters of such rivers by other users.

In conformity with this policy:

(a) Plans, proposals, or reports of the Chief of Engineers, Department of the Army, for any works of improvement for navigation or flood control not heretofore or herein authorized, shall be submitted to the Congress only upon compliance with the provisions of this paragraph (a). Investigations which form the basis for any such plans, proposals, or reports shall be conducted in such a manner as to give to the affected State or States, during the course of the investigations, information developed by the investigations and also opportunity for consultation regarding plans and proposals, and, to

the extent deemed practicable by the Chief of Engineers, opportunity to cooperate in the investigations. If such investigations in whole or part are concerned with the use or control of waters arising west of the ninety-seventh meridian, the Chief of Engineers shall give to the Secretary of the Interior, during the course of the investigations, information developed by the investigations and also opportunity for consultation regarding plans and proposals, and to the extent deemed practicable by the Chief of Engineers, opportunity to cooperate in the investigations. The relations of the Chief of Engineers with any State under this paragraph (a) shall be with the Governor of the State or such official or agency of the State as the Governor may designate. The term "affected State or States" shall include those in which the works or any part thereof are proposed to be located; those which in whole or part are both within the drainage basin involved and situated in a State lying wholly or in part west of the ninety-eighth meridian; and such of those which are east of the ninety-eighth meridian as, in the judgment of the Chief of Engineers, will be substantially affected. Such plans, proposals, or reports and related investigations shall be made to the end, among other things, of facilitating the coordination of plans for the construction and operation of the proposed works with other plans involving the waters which would be used or controlled by such proposed works. Each report submitting any such plans or proposals to the Congress shall set out therein, among other things, the relationship between the plans for construction and operation of the proposed works and the plans, if any, submitted by the

affected States and by the Secretary of the Interior. The Chief of Engineers shall transmit a copy of his proposed report to each affected State, and, in the case the plans or proposals covered by the report are concerned with the use or control of waters which rise in whole or in part west of the ninety-seventh meridian, to the Secretary of the Interior. Within ninety days from the date of receipt of said proposed report, the written views and recommendations of each affected State and of the Secretary of the Interior may be submitted to the Chief of Engineers. The Secretary of the Army shall transmit to the Congress, with such comments and recommendations as he deems appropriate, the proposed report together with the submitted views and recommendations of affected States and of the Secretary of the Interior. The Secretary of the Army may prepare and make said transmittal any time following said ninety-day period. The letter of transmittal and its attachments shall be printed as a House or Senate document.

(b) The use for navigation, in connection with the operation and maintenance of such works herein authorized for construction, of waters arising in States lying wholly or partly west of the ninety-eighth meridian shall be only such use as does not conflict with any beneficial consumptive use, present or future, in States lying wholly or partly west of the ninety-eighth meridian, of such waters for domestic, municipal, stock water, irrigation, mining, or industrial purposes.

(c) The Secretary of the Interior, in making investigations of and reports on works for irrigation and purposes incidental thereto shall, in

relation to an affected State or States (as defined in paragraph (a) of this section), and to the Secretary of the Army, be subject to the same provisions regarding investigations, plans, proposals, and reports as prescribed in paragraph (a) of this section for the Chief of Engineers and the Secretary of the Army. In the event a submission of views and recommendations, made by an affected State or by the Secretary of the Army pursuant to said provisions, sets forth objections to the plans or proposals covered by the report of the Secretary of the Interior, the proposed works shall not be deemed authorized except upon approval by an Act of Congress; and section 485h(a) of title 43 [subsection 9(a) of the Reclamation Project Act of 1939 (64 Stat. 1187)] and section 590z-1(a) of title 16 [section 3(a) of the Act of August 11, 1939 (53 Stat. 1418), as amended] are amended accordingly.

(Act of Dec. 22, 1944, ch. 665, §1, 58 Stat. 887.)

Appendix Item 3

Excerpt from
A. Golze, *Reclamation in the United States* (1961)

Again, in 1939, Congress recognized the difficulty of financing the large and expensive multiple-purpose projects under the rigid terms of the earlier Acts. It modified the rules of feasibility for multiple-purpose projects by recognizing benefits that were national in character, such as flood control and navigation, to be nonreimbursable. It further met the problem of anticipated higher cost of irrigation projects beyond the ability of the water users to pay, by providing for a credit of power revenues to irrigation when such revenues were excess to the cost of repaying the investment in power facilities. Under the 1939 Act the Secretary of the Interior was given back the power to make a finding of feasibility, which had rested with the President since 1910.

> The 1939 Act is the law under which reports for authorization (or findings of feasibility) are prepared. While the Secretary of the Interior has authority to find a project feasible and therefore authorized, if it meets the requirements of the Act, most projects have actually been authorized by special Acts of Congress, based on reports submitted by the Secretary. . . .

A. Golze, *Reclamation in the United States* 125 (1961).

Appendix Item 4

Excerpts from Jt. Exh. 3

Record of Twelfth Meeting
Colorado-Kansas Arkansas River Compact Commission
February 3, 4, 5, and 6, 1948

> Chairman Kramer stated that the Administration should not be vested with anything in the nature of police powers or powers to take any physical action such as requiring the shutting of gates or the padlocking of gates or any type of action that the water commissioner or State Engineer might be authorized to take; that he did not envision the Administration as a quasi-judicial or police body; that the corollary to that is, where something came to the attention of the Administration that required corrective action, the same should properly be referred to the officials or agencies of the state which were empowered to act on such complaint.

Record at 12-48.

> Attorney General Hinkley [of Colorado] offered the following quotation for the consideration of the Commission.
>
> "Consideration should be given to the conclusion of the National Reclamation Association's Committee on the integrity of state water law that the granting of judicial functions to a compact administrative commission is questioned. It is doubtful that a compact could create a judicial body to disburse on an interstate stream within the political and legal concepts of the federal and state constitutions. The primary obligation to abide by the terms of a compact rests upon the constituted authorities of the signatory states. This involves a determination by the officials of each state of the interpretation of its terms. Controversies among the states on the issue of alleged failure to comply with the terms of a compact or on a

> question of their interpretation must be resolved by appropriate action in the Supreme Court of the United States. Therefore, a compact Commission's powers must be limited to those of an administrative character, and such powers for the purpose of enforcement cannot supersede, expressly or by implication, those of the constituted state authorities, whose action in this respect, of course, is subject to review by the United States Supreme Court. Failure of State officials to accept the findings of a compact Commission and to comport with the rules set up by such a body for the purpose of the administrative functions may constitute an issue of compact violation."

Mr. Hinkley stated that he had such a matter in mind in connection with work that was being done on the Colorado River and that the quoted proposal was tentatively suggested; that findings of fact by the Commission should not be conclusive in any court or tribunal which might be called upon to interpret or enforce the Compact.

Id. at 12-52 to 12-53.

Appendix Item 5

Excerpt from Jt. Exh. 3

Record of Sixteenth Meeting
Colorado-Kansas Arkansas River Compact Commission

November 8, 9, and 10, 1948

Chairman Kramer directed the attention of the Commission to a passage in the June 1948 report of the Bureau of Reclamation on the Gunnison-Arkansas Project. He noted that such was a preliminary draft of the proposed report; that it contained a chapter on water compacts; that one pertinent paragraph relating to functions in the proposed Compact read: "The waters passing the eastern boundary of Colorado are also subject to compact. No agreement has been reached, however, between the States of Colorado and Kansas upon the allocation of Arkansas River water to each of the two states. It is felt that the Colorado-Kansas Compact will not be inimical to the Gunnison-Arkansas Project; "that this matter was being cited and placed on the record so that there would be no question but that this Commission had cognizance of the development of the Gunnison-Arkansas project; that is [sic] relationship to the Arkansas River Compact which was being negotiated, had been recognized; that the report was dated June 1948, at which time the crystallization of the present Compact had not taken place. He inquired if there was any doubt in any Commissioner's mind that this Compact as of this date would be in any way inimical to the Gunnison-Arkansas Project. Commissioners Vidal and Ireland replied they knew of none. Commissioner Knapp stated that he did not want to answer yes or no because he had not read the report.

Record at 16-78 to 16-79.

Appendix Item 6

Excerpt from Colo. Exh. 643

Interim Report
Gunnison-Arkansas Project, Colorado,
Project Planning Report No. 7-8a.49-0 (June 1948)

Water supply

51. Based upon hydrologic studies, an average of 60,000 acre-feet each year could have been diverted from the Fryingpan River to the Eastern Slope during the 34-year period 1911-1944. Facilities provided by the Initial Development would enable the storage of an additional 30,000 acre-feet of water annually from the existing Independence Pass (Twin Lakes) Diversion, and an additional 2,000 acre-feet from the Wurtz Ditch Diversion. Excess flood flows of the Arkansas River amounting to about 5,000 acre-feet each year could also be stored. Winter flows of the Arkansas River, averaging 97,000 acre-feet before deduction of losses, are now used for winter irrigation. Providing the water users are agreeable, which seems likely, the storage of that water would enable a more beneficial use during the ensuing irrigation season. Thus, upward of 194,000 acre-feet less losses of streamflow each year could be conserved or converted to more beneficial use by the Initial Development. That annual flow, combined with holdover storage and return flows, would provide much of the water supply needed to alleviate the 1911-1944 average shortage of 36 percent of the estimated ideal headgate diversion requirements encountered by lands between Pueblo and the Colorado-Kansas boundary.

Report of the Regional Director at 12.

JAN 3 1995

No. 105, ORIGINAL

In The

SUPREME COURT OF THE UNITED STATES
October Term, 1994

STATE OF KANSAS,
Plaintiff,

v.

STATE OF COLORADO,
Defendant,

and

UNITED STATES OF AMERICA,
Defendant-Intervenor.

ON EXCEPTIONS TO THE 1994 REPORT OF THE SPECIAL MASTER

KANSAS' REPLY BRIEF OPPOSING COLORADO'S EXCEPTIONS

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January 3, 1995

RESTATEMENT OF QUESTION PRESENTED

Colorado states the first of its Questions Presented as follows:

> 1. Whether the defense of laches is applicable against a state in a controversy between states in this Court.

The question should be stated as follows:

> 1. Whether the defense of laches is applicable against a state seeking to enforce an interstate compact in this Court.

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OBJECTIONS TO COLORADO'S STATEMENT OF THE CASE

There are several incorrect statements or implications in Colorado's Statement of the Case (Colo. Brief at 2-24).[1] The most significant mistakes are noted below.

In the opening paragraphs of Colorado's Statement of the Case, Colorado asserts that "the Master found that Kansas knew or should have known of the effects of post-compact well pumping in Colorado by 1968 . . . ." Colo. Brief at 3. This statement is not true. The critical distinction is between knowledge of the

---

[1] Colorado's Brief In Support of Colorado's Exceptions, filed November 17, 1994 in this proceeding, will be referred to as "Colo. Brief at __"

existence of postcompact well pumping and knowledge of the *effects of pumping on usable stateline flows*. The Master's conclusion on this point was as follows: "The extent of postcompact well pumping in Colorado was not generally known until approximately 1968, and there is no substantial evidence that Kansas knew or should have known about the effect of such well development before that time." Rep. vol. I at 169.[2] The Master went on to state: "By the 1970s the extent of pumping in Colorado was a matter of common knowledge, but that is not to say that the impact of such pumping on usable Stateline flows was generally known or understood. Indeed, it appears not to have been, even in Colorado." *Id*. This statement refutes the Colorado assertion. Under Article IV-D of the Compact, postcompact wells and pumping and increased pumping by precompact wells are not prohibited per se; rather, such pumping is prohibited only to the extent that the *effect* of such pumping is to materially deplete the waters of the Arkansas River in usable quantity or availability for use to the water users in Colorado and Kansas. Arkansas River Compact ("Compact"), Art. IV-D, Rep. App., Ex. 1 at App. 5.

Colorado asserts that "According to a careful study made by Colorado, Report at 204, there are 717 large-capacity . . . wells in Colorado . . . with appropriation dates earlier than 1950." Colo. Brief at 8. On the contrary, Colorado did not do a careful study of pre-1950 wells. The cited reference in the Master's Report does not refer to pre-1950 wells. That statement appears in the "Postcompact Pumping in Colorado" section of the Master's Report. *See* Rep. vol. II at 201. The assignment of priority dates was not carefully done by Colorado. In fact, Colorado simply accepted the priority dates claimed by the well owners themselves in uncontested Colorado water court filings, some of which admittedly contain false claims. Rep. vol. II at 191 & n.64. R. vol. 131 at 22, Pl. Reply App., Item 19; vol. 84 at 24-26, Pl. Reply App., Item 16. Finally, "pre-1950" is not the same as "precompact". The Compact was concluded by the negotiators on December 14, 1948. It was ratified by the states and consented to by Congress in the spring of 1949. Act of Congress of May 31, 1949, 63 State. 145; 1949 Kan. Sess. Laws 829; 1949 Colo. Sess. Laws 485. The approvals by the state legislatures and Congress ratified the agreement of the negotiators, which included the agreement to protect users existing at the time of the agreement, December 14, 1948. *See* Rep. vol. I at 99-102, 107.

[2] The Master's Report, ordered filed October 3, 1994, 115 S.Ct. 48 (1994), will be referred to as "Rep. vol. ____ at ____"

Colorado also implies in its Statement of the Case that the increase in irrigated acreage in Kansas by virtue of increased pumping of the Ogallala Aquifer in Kansas should absolve Colorado of responsibility for its violations of the Arkansas River Compact. *See* Colo. Brief at 9-13. On the contrary, pumping in Kansas is relevant only if it affects Colorado water users, and there is no evidence that the declining levels in the Ogallala Aquifer have caused Colorado to be deprived of any Arkansas River Water; rather, the reductions of stateline flows by Colorado has hastened groundwater declines in Kansas. Jt. Ex. 139 at 55 (R. vol. 30 at 35, 75, 76), Pl. Reply App., Item 10.

Colorado attempts to conceal the apportionment of the Arkansas River accomplished by the Arkansas River Compact, saying:

> The Compact does not apportion the waters of the Arkansas River between Colorado and Kansas based on beneficial consumptive use or a Stateline delivery obligation, as in some other interstate water compacts, but instead gives both states the right to make demands for releases from John Martin Reservoir at the times and at the rates specified in the Compact. Colo. Brief at 15.

Colorado would like to limit the Compact to "the right to make demands for releases from John Martin Reservoir." The truth is that the Compact sought to and did achieve much more than that. Article I-B of the Compact makes this clear:

The major purposes of this Compact are to:

• • • •

> B. *Equitably divide and apportion between the States of Colorado and Kansas the waters of the Arkansas River* and their utilization *as well as* the benefits arising from the construction, operation and maintenance by the United States of John Martin Reservoir Project for water conservation purposes. Rep. App., Ex. 1 at App. 2 (emphasis added).

The Master found that this purpose had been achieved. Rep. vol. I at 107. He said, "The apportionment in the compact includes the normal flows of the river, as well as a division of the benefits associated with the conservation pool in John Martin Reservoir." *Id.* The apportionment of the normal flows of the river was accomplished by including the critical proviso in Article IV-D concerning future development or construction:

> Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction.

Thus, the apportionment achieved by the Compact was not limited to division of the benefits of John Martin Reservoir.

In the same vein, Colorado maintains that the philosophy of "live and let live" should apply to future developments in the basin under the Compact. Colo. Brief at 15-16 & n.17. If accepted, this phrase could reduce the Compact to a useless gesture. The Master rejected the Colorado position. *See* Rep. vol. I at 106. Colorado's position is based on two documents, both of which are dated some years after the adoption of the Compact.

They report the use by Hans Kramer[3] of the phrase "live and let live." Gen. Kramer made no mention, so far as we are aware, of "live and let live" during the negotiation of the Compact or in the hearings before Congress in 1949 concerning congressional consent to the Compact.

After-the-fact statements by a person involved in the legislative process, as Gen. Kramer was in the drafting of the Compact, are accorded no probative weight in ascertaining the intent of the legislation. *Bread Political Action Comm. v. Federal Election Comm'n*, 455 U.S. 577, 582 n.3 (1982); *Petry v. Block*, 697 F.2d 1169, 1171 (CADC 1983). Moreover, even legislative history should not be resorted to if the wording of the legislation is itself plain. *See, e.g., Negonsott v. Samuels*, 113 S. Ct. 1119, 1122-23 (1993), *Reves v. Ernst & Young*, 113 S. Ct. 1163, 1169 (1993). The language of Article IV-D is plain. Therefore, these after-the-fact statements cited by Colorado to weaken that language are not admissible.

The first document referred to by Colorado is a letter of April 10, 1951 from Gen. Kramer to the Corps of Engineers explaining why no engineering reports were finalized and released to the public in the course of the negotiations of the Compact:

> However, even before the date of the Second Interim [Engineering] Report, the trend of the negotiations took a decided turn away from the concept of fixed operating conditions based on firm interstate allocations toward the more flexible philosophy, best described as "live and let live," which became the basis of the ultimate Compact. That principle, which was an outgrowth of the Interim Executive Agreement be-

[3] Kramer was the federal representative and chairman of the commission that negotiated the Arkansas River Compact and later served in the same capacities on the Arkansas River Compact Administration. He was a retired Brigadier General with the U.S. Army Corps of Engineers. Rep. vol. I at 91.

> tween Colorado and Kansas governing the operation of John Martin Reservoir during the period of compact negotiations, permitted either State to obtain water from John Martin Reservoir (when stored water was available) without regard to the other State and without the need for keeping books to balance hypothetical debits and credits. Def. Ex. 57 at 2 (R. vol. 12 at 7), Pl. Reply App., Item 3.

The Master concluded that these remarks related only to the conservation pool in John Martin and the ability of both states to draw upon it according to need, not to the Compact as a whole. Rep. vol. I at 106. The language quoted clearly supports the Master's conclusion. The language in Gen. Kramer's letter also expresses the purpose of the negotiators to maintain the status quo. *See* Kansas' Brief In Support of Exceptions at 5; Rep. vol. I at 107. If specific inflow-outflow requirements with index gages had been adopted, engineering studies would have been necessary, and there was the possibility that some existing uses might occasionally have been curtailed. Instead, the Compact negotiators adopted the Article IV-D proviso protecting existing uses from material depletions of usable flow. This compacting approach left to later enforcement actions, such as this one, the necessity of quantifying any departure from the status quo in 1948.

The second document to which Colorado refers for Gen. Kramer's use of the phrase "live and let live" is a set of minutes of the Arkansas River Compact Administration. The phrase occurs in the context of a discussion of materiality. Both state delegations to the Compact Administration, including persons who had earlier represented the states in the Compact negotiations,[4] having heard

[4] The members of the Compact Administration who had served on the Compact Commission which negotiated the Compact were Mendenhall from Colorado and Leavitt and Tate from Kansas. *See* Rep. vol. I at 91-92; Jt. Ex. 19, Minutes of Dec. 14, 1954 meeting, at 11-14 (R. vol. 17, at 87, 88), Pl. Reply App., Item 6.

Gen. Kramer's presentation on materiality, including his use of the phrase "live and let live," voted to reject the General's position. Jt. Ex. 19, Minutes of Dec. 14, 1954 meeting at 11-14 (R. vol. 17 at 87, 89), Pl. Reply App., Item 6.

For all of the foregoing reasons, Colorado's suggestion that the mandatory terms of the Compact be relaxed based on after-the-fact statements by Gen. Kramer should be rejected in favor of the primary source for determining the intent of Article IV-D, the language of Article IV-D itself.

SUMMARY OF ARGUMENT [5]

It is important to note at the outset that nowhere in its exceptions or supporting brief does Colorado deny that it has violated the Arkansas River Compact by virtue of increased postcompact pumping in Colorado over the period 1950-85. Colorado's arguments on laches, precompact pumping, the 1980 Operating Plan and the burden of proof do not question the existence of that violation.

I. Laches.

Even if the facts of this case would support the defense of laches, which they do not, the defense of laches is generally inapplicable against a state in an interstate controversy, as a matter of law. *Illinois v. Kentucky*, 500 U.S. 380, 388 (1991). Moreover, because equitable doctrines such as laches are particularly inconsistent with the precedents of the Court in interstate compact enforcement proceedings, Kansas has restated Colorado's first question presented accordingly. Colorado insists that there should be essentially no remedy for past breaches of the Compact because it had no reason to believe it would be sued. Colorado relies

[5] This brief is organized to track as closely as possible the Brief in Support of Colorado's Exceptions. Parts III and IV of the Argument in this brief correspond, however, to Parts IV and V of the Colorado Brief because there is no Part III in the Colorado Brief.

in this regard on the specialized rules tailored for equitable apportionment cases such as *Colorado v. Kansas*, 320 U.S. 383 (1943). While equitable considerations are central in equitable apportionment cases, they are out of place in compact enforcement cases. *See, e.g., Texas v. New Mexico*, 462 U.S. 554 (1983); 482 U.S. 124 (1987); *Oklahoma v. New Mexico*, 501 U.S. 221 (1991).

If, *arguendo*, laches is available as a matter of legal theory to Colorado, the facts in this case do not show inexcusable delay that would give rise to laches. In fact, there was no delay at all. Colorado claims that Kansas knew or should have known of well development in Colorado. The existence of well development in Colorado is not the question, however. The question is whether Kansas as a state can be charged with knowledge of the *effects* of postcompact well pumping on usable stateline flows as governed by Article IV-D of the Arkansas River Compact. There is no evidence that Kansas was aware of Compact violations. Indeed, Colorado steadfastly denied that there could be any such effects as late as the eve of the filing of this litigation. In addition, Colorado asserted that there was not even any need to investigate such effects. *See* Jt. Ex. 32 at 23 (R. vol. 14 at 12, 22, 26), Pl. Reply App., Item 7.[6] If Colorado believed there was no need to investigate such effects, it is hard to understand how Colorado can now assert that Kansas had for many years a duty to investigate those same effects.

II. Precompact Pumping.

The Master correctly rejected Colorado's excessive claim for a right to almost 50,000 acre-feet per year of pumping by precompact wells. This figure was not based on estimates of actual precompact pumping but on calculations assuming that uncontested filings in Colorado water court were correct and that Colorado had a right to expand the use of precompact wells up to their claimed capacities. Rep. vol. II at 182-83. The Master determined that the highest annual amount pumped during the Compact negotiations would be the limit of Colorado's precompact entitlement. Rep. vol. I at 190-200. The U.S. Geological Survey (USGS) reported that the highest amount actually pumped during the negotiations of the Compact was 15,000 acre-feet per year. Kansas, which relied in part on the USGS findings, found that the highest amount actually pumped in the study area for this case during the Compact negotiations was 11,000 acre-feet per year.

[6] "Pl. Reply App., Item _____" refers to material in the Appendix to this brief.

The fundamental issues are (1) whether Article IV-D limits the Colorado entitlement to the amount actually pumped at the time of the Compact negotiations and (2), if so, what that amount was. Article IV-D permits Colorado to continue the actual groundwater pumping that was occurring at the time of the negotiation of the Compact, but does not allow Colorado to "improve or prolong the functioning"[7] of those precompact wells if to do so would violate the proviso of Article IV-D. The Master embraced the Kansas legal position on precompact pumping. The Master did not accept the Kansas figures for the maximum precompact pumping of 11,000 acre-feet per year, however. Instead, he endorsed the figure of 15,000 acre-feet per year determined by the USGS and accepted over the last several decades by the USGS and by all three branches of the Colorado State government.

[7] The exact words of Article IV-D, "the improved or prolonged functioning of existing works" includes any increase in the pumping of precompact wells beyond the precompact volumes pumped. Rep. vol. I at 108, vol. II at 194.

III. The 1980 Operating Plan.

The Master rejected Colorado's claim that benefits received by Kansas, under a resolution of the Compact Administration known as the 1980 Operating Plan for John Martin Reservoir, should offset violations of the Compact by Colorado. The Master found that the benefits accruing to both states from the 1980 Operating Plan were separately bargained for and should not be offset against compact violations. The 1980 Operating Plan was not intended to have the effect claimed by Colorado, as shown by its own provisions and the fact that long afterward Colorado was still denying that there were any depletions caused by postcompact well pumping in Colorado. Colorado was not admitting that there were Compact violations due to postcompact well pumping in Colorado in 1980, nor even in 1985 on the eve of the filing of this litigation.

IV. Standard of Proof.

Colorado claims that Kansas should be required to prove a breach of the Compact by clear and convincing evidence. This position was carefully analyzed by the Master and correctly rejected. Colorado's position relies on the misconception that this case is an equitable apportionment case. The Court recently stated in *Nebraska v. Wyoming*, 113 S. Ct. 1689, 1694-96 (1993), that the clear and convincing standard applies only to the initial establishment of an equitable apportionment and not to the enforcement thereof. Colorado does not claim that Kansas is seeking a new equitable apportionment in this case. It must admit that this is indeed a compact enforcement case.

An unusually high burden of proof thwarts the enforcement of a federal statute, namely, the Compact, and would promote irresponsibility on Colorado's part. Colorado consistently cites equitable apportionment cases in making its argument. It also suggests that a higher burden of proof is required because of the seriousness of the issues involved in interstate cases. Kansas

agrees that the issues are serious, but raising the burden of proof is not a proper response to that fact. Placing an unusually high burden of proof on the plaintiff makes it more likely that a defendant state can violate a compact with impunity. The higher burden of proof is inconsistent with the purposes of the Compact Clause and with the Court's recommendation to Kansas and Colorado in its 1943 decision, of the compacting process under Article I, Section 10, Clause 3 of the Constitution as the preferred alternative to equitable apportionment litigation. *See Colorado v. Kansas*, 320 U.S. 383, 392 (1943).

ARGUMENT [9]

I. Laches Should Not Bar Kansas' Claim for Damages.

Colorado asserts in its Exceptions a position that it has not asserted previously in this litigation. *See* Colo. Brief at 24-64. In fact, this is the third distinct position Colorado has taken on laches since the close of trial. Colorado initially took the position that Kansas should not be entitled to relief for well development which took place prior to 1965. *See* Colorado's Closing Brief re Kansas' Well Claim at 44, 48, Pleading Index Tab No. 383,[9] Pl. Reply App., Item 20. Colorado's position was that Kansas should be barred from all relief, both past damages and future remedies, for Compact violations caused by wells drilled prior to 1965 (later changed to 1966). Colorado was asking the Court to forever "grandfather" over 90% of all postcompact wells in Colorado.[10]

When the Master indicated that he intended to reject Colorado's position on laches, Colorado limited its position to a claim

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[9] Kansas does not concede any argument made in support of Colorado's exceptions even if not specifically addressed in this brief.

[9] "Pleading Index Tab No. _____" refers to the Pleading Index enclosed with Special Master Littleworth's letter of August 2, 1994 to Francis J. Lorson, Chief Deputy Clerk.

[10] Table 1, Pl. Ex. 30 (R. vol. 21, at 117, vol. 22, at 21, 30), Pl. App., Item 1 shows 849 wells in 1948, 2,377 wells in 1965 and 2,543 wells in 1985.

that laches should bar Kansas' well claim only as to damages for pumping which occurred up to 1975. Colorado's Memorandum Re Matters to Be Raised at Oral Argument at 2, 4-5, 52, Pleading Index Tab No. 421, Pl. Reply App., Item 21. The Master, however, rejected both positions:

> I conclude, therefore, that Kansas has not been guilty of inexcusable delay in making its well claim, and that Colorado has not been prejudiced by Kansas' failure to press its claim earlier. Kansas should not be barred by laches or any other equitable defense, including acquiescence, from obtaining relief based on its well claim. In reaching these conclusions, I have fully considered the Court's statement in *Colorado v. Kansas*, 320 U.S. 383 at 394, that unjustified delay must "gravely add" to the plaintiff's burden and be weighed in considering the equities of the case. Rep. vol. I at 170.

Now Colorado has taken yet a third, more expansive position, namely, that Kansas should be barred from all relief for Compact violations by Colorado up to the year in which this litigation was initiated. Colo. Brief at 23, 63. The new Colorado position would essentially deny Kansas any remedy for past breaches of the Compact by Colorado. In *Texas v. New Mexico*, 482 U.S. 124 (1987), this Court rejected a similar argument:

> We find no merit in [New Mexico's] submission that we may order only prospective relief, that is, requiring future performance of compact obligations without a remedy for past breaches. If that were the case, New Mexico's defaults could never be remedied. . . . There is nothing in the nature of compacts generally or of this Compact in particular that counsels against rectifying a failure to perform in the past as well as ordering future performance called for by the Compact. 482 U.S. at 128.

Acceptance of Colorado's position would also encourage states such as Colorado to violate interstate compacts because there would be no disadvantage to doing so.

A. Laches Should Rarely, if Ever, Be Applied Against A State Seeking To Enforce an Interstate Compact.

Colorado begins its argument on laches by arguing that states appearing before the U.S. Supreme Court under its original jurisdiction should be treated like foreign sovereigns and thus denied the normal protection a state enjoys against laches. Colo. Brief at 27-29. This is a novel argument indeed, especially in light of the Court's recent statement in an original-jurisdiction case (relying on the case cited by Colorado) that "the laches defense is generally inapplicable against a State." *Illinois v. Kentucky*, 500 U.S. 380, 388 (1991), *citing Guaranty Trust Co. v. United States*, 304 U.S. 126 (1938). The very case upon which Colorado relies for its argument, *Guaranty Trust*, makes clear that the ruling in that case—that the statute of limitations runs against a foreign government—does not apply to state governments appearing in federal court. In *Guaranty Trust*, the United States had brought suit against Guaranty Trust to recover a deposit of the Russian government of which the United States was the assignee. Guaranty Trust asserted the statute of limitations as a defense. The Court analyzed the underlying policies as follows:

> The rule quod nullum tempus occurrit regi—that the sovereign is exempt from the consequences of its laches, and from the operation of statutes of limitations—appears to be a vestigial survival of the prerogative of the Crown. But whether or not that alone accounts for its origin, ... it is . . . *equally applicable to all governments*." . . . So complete has been

> its acceptance that the implied immunity of the *domestic "sovereign," state or national*, has been universally deemed to be an exception to local statutes of limitations where *the government, state or national*, is not expressly included . . . . 304 U.S. at 132-33 (emphasis added) (citations omitted).

Thus, the Court makes clear, in the very opinion upon which Colorado relies, that domestic sovereigns, including states, enjoy the protection of the rule of *nullum tempus*.

The Colorado argument misses much of the Kansas position on laches. It is not only the status of the parties as states that bars laches, but also the type of proceeding in which Kansas and Colorado are currently involved, namely the enforcement of a federal statute, the Arkansas River Compact. Colorado cites only one interstate water allocation case to support its argument—*Colorado v. Kansas*, 320 U.S. 383, 394 (1943). That case was an equitable apportionment case in which equitable doctrines were generally appropriate. Colorado could not cite a compact enforcement case recognizing laches, because there is none. Colorado is thus asking this Court to apply for the first time the doctrine of laches to absolve a compacting state of violating an interstate compact. *See* Rep. vol. I at 150.

Traditionally, equitable considerations have played no role in determining violations or liability for past damages in compact enforcement proceedings. *See Texas v. New Mexico*, 462 U.S. 554 (1983); 482 U.S. 124 (1987). This Court recently said in *Nebraska v. Wyoming*, 113 S.Ct. 1689 (1993):

> The two types of proceeding [enforcement action versus modification of a prior equitable apportionment decree] are markedly different. In an enforcement action, the plaintiff need not show injury. When the alleged conduct is admitted, the only question is whether that conduct violates a right established by the decree. To be sure, the right need not be stated explicitly in the

> decree . . . . But the underlying issue primarily remains one of interpretation. In a modification proceeding, by contrast, there is by definition no pre-existing right to interpret or enforce. At least where the case concerns the impact of new development [requiring a new or modified equitable apportionment], the inquiry may well entail the same sort of *balancing of equities* that occurs in an initial proceeding to establish an equitable apportionment. 113 S.Ct. at 1695 (emphasis added) (citations omitted).

Even though the equitable apportionment of the Arkansas River was already achieved in the Compact, Colorado is essentially asking the Court to once again "balance the equities" when it asks that an admitted violation of the Compact be overlooked for equitable reasons outside the Compact. Colorado is asserting that, for the 36-year period 1950-85, equitable considerations should defeat the apportionment of waters adopted by its own General Assembly and by Congress pursuant to Article I, Section 10, Clause 3 of the Constitution. To do so would, in effect, amount to a reapportionment of the waters of the Arkansas River for the period 1950-85. The Court has addressed its ability to alter the terms of an interstate compact:

> Under the Compact Clause, two States may not conclude an agreement such as the Pecos River Compact without the consent of the United States Congress. However, once given, "congressional consent transforms an interstate compact within this Clause into a law of the United States." One consequence of this metamorphosis is that, unless the compact to which Congress has consented is somehow unconstitutional, *no court may order relief inconsistent with its express terms*. *Texas v. New Mexico*, 462 U.S. 554, 564 (1983), (emphasis added) (citations omitted).

Colorado is asking this Court for nothing less than to order relief inconsistent with the express terms of the Arkansas River Compact. Those express terms, found in Article IV-D, prohibit future beneficial developments of the Arkansas River Basin in Colorado that involve the improved or prolonged functioning[11] of existing works and that materially deplete the waters of the Arkansas River in usable quantity or availability for use to the water users in Kansas and Colorado.

Colorado cites a number of non-compact enforcement cases to support its contention that laches should apply in a compact enforcement case such as the present one. Colo. Brief at 29-30. This approach fails to recognize the considerable difference between entering an injunction based on equitable principles and enforcing a federal statute in the form of an interstate compact.

Colorado cites *Missouri v. Illinois*, 200 U.S. 496, 520 (1906) for the proposition that "[i]t would be contradicting a fundamental principle of human nature to allow no effect to the lapse of time, however long." Colo. Brief at 30. Contrary to the truncation of the quotation by Colorado, the sentence quoted continues, after a citation, as follows: "yet the fixing of a definite time usually belongs to the legislature rather than the courts." 200 U.S. at 520. The sentence appears in the midst of a discussion by Justice Holmes of the difficulties of establishing a system of law applicable to interstate disputes which does not fall within the power of Congress to regulate. The implication that arises by the truncation of the quotation in the Colorado Brief—that this Court will step in at some point and impose a time limit—does not exist in the opinion when read as a whole.[12] The point of the discussion

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[11] For the meaning of "improved or prolonged functioning," *see* note 7, *supra*.

[12] A fuller quotation from the opinion is as follows:

> The Constitution extends the judicial power of the United States to controversies between two or more States and between a State and citizens of another State, and gives this court original jurisdiction in cases in which a State shall be a party. Therefore, if one state raises a controversy with another, this court must determine whether there is any principle of law, and, if any, what, on which the plaintiff can recover. But the fact that this court must decide does not mean, of course, that it takes the place of a legislature. Some principles it must have power to declare. For instance, when a dispute arises about boundaries, this court must determine the line and in doing so must be governed by rules explicitly or implicitly recognized. It must follow and apply those rules, even if legislation of one or both of the States seems to stand in the way. But the words of the Constitution would be a narrow ground upon which to construct and apply to the relations between States the same system of municipal law in all its details which would be applied between individuals. If we suppose a case which did not fall within the power of Congress to regulate, the result of a declaration of rights by this court would be the establishment of a rule which would be irrevocable by any power except that of this court to reverse its own decision, an amendment of the Constitution, or possibly an agreement between the States sanctioned by the legislature of the United States.
>
> The difficulties in the way of establishing such a system of law might not be insuperable, but they would be great and new. Take the question of prescription in a case like the present. The reasons on which prescription for a public nuisance is denied or may be granted to an individual as against the sovereign power to which he is subject have no application to an independent state. *It would be contradicting a fundamental principle of human nature to allow no effect to the lapse of time, however long, yet the fixing of a definite time usually belongs to the legislature rather than the courts.* The courts did fix a time in the rule against perpetuities, but the usual course, as in the instances of statutes of limitation, the duration of patents, the age of majority, etc., is to depend upon the lawmaking power. *Missouri v. Illinois*, 200 U.S. at 519-20 (emphasis added) (citations omitted).

is that, except in unusual circumstances, the Court will not impose a time limit for the bringing of interstate actions if Congress has not seen fit to impose one.

Colorado suggests that allowing laches to be asserted against Kansas in this case would ease the Court's burden. Colo. Brief at 31. The result of accepting the Colorado position is actually the opposite, as the Master recognized. He said, "Moreover, equitable defenses should not be applied in ways to encourage or force early litigation between states, particularly when a state is implementing efforts to address the problem." Rep. vol. I at 170. If Colorado's position is accepted, early litigation will be encouraged between states; no efforts to resolve disputes prior to litigation will be undertaken because informal complaints short of bringing suit are insufficient according to the cases cited by Colorado. *See, e.g., A.C. Aukerman Co. v. R.L. Chaides Constr. Co.*, 960 F.2d 1020 (CA Fed 1992); *Potash Co. of America v. International Minerals & Chem. Corp.*, 213 F.2d 153 (CA10, 1954); *Jensen v. Western Irrigation & Mfg.*, 650 F.2d 165 (CA9, 1980). Thus, application of the doctrine of laches will only increase litigation because any action short of filing suit may become a bar to later recovery.

Colorado contends that laches should be applied because Colorado "had no reason to believe it would be sued." Colo. Brief at 31 n.27. By this assertion, Colorado seeks to distinguish its position from New Mexico's position in *Texas v. New Mexico*, 482 U.S. at 129, that it should have been absolved of its compact violations because it believed in good faith that it was complying with the Pecos River Compact. The Court answered New Mexico's argument as follows:

> But good-faith differences about the scope of contractual undertakings do not relieve either party from performance. A court should provide a remedy if the parties intended to make a contract and the contract's terms provide a sufficiently certain basis for determining both that a breach has in fact occurred and the nature of the remedy called for. There is often a retroactive impact when courts resolve contract disputes about the scope of a promisor's undertaking; parties must perform today or pay damages for what a court decides they promised to do yesterday and did not. In our view, New Mexico cannot escape liability for what has been adjudicated to be past failures to perform its duties under the Compact. *Id.* (citations omitted).

Colorado's contention that it differs from New Mexico because it had no reason to believe that it would be sued is unpersuasive. In the dispute over the Pecos River, New Mexico asserted various reasons why it should not be sued or be required to pay damages in water or money for violations of the Pecos River Compact—a position consistently rejected by this Court. *See Texas v. New Mexico*, 462 U.S. 554 (1983), 482 U.S. 124 (1987). Likewise, Colorado's similar position should be rejected.

B. Kansas Was Not Guilty of Laches in Making Its Well Claim.

Notwithstanding this Court's statements that laches generally does not apply in interstate controversies, and the fact that laches has never been applied in any compact enforcement case, Colorado devotes much of its argument to asserting facts that it believes would support the defense of laches. Colo. Brief at 32-64 and *passim*. Contrary to Colorado's argument, those facts would not support the defense of laches even if it were applicable. Laches requires an inexcusable delay. Here, there was no delay at all. Kansas brought the well-pumping issue to the Compact Administration without delay after it received a report from its consultants, Simons, Li & Associates, indicating a Compact violation. Rep. vol. I at 153. This was done in compliance with Article VIII-H of the Compact, Rep. App., Ex. 1 at App. 15. Even then Colorado opposed such an investigation on the ground that it was not justified. Jt. Ex. 32 at 22-23 (R. vol. 14 at 12, 22, 26), Pl. Reply App., Item 7. Kansas had no knowledge nor reason to know that Colorado pumping was violating the Compact before being informed by its consultants in 1984. That report was initiated,

after the Trinidad dispute arose, in order to determine whether Trinidad operations or any other activity in Colorado constituted a violation of the Compact. Jt. Ex. 88 at 1.1, Pl. Reply App., Item 8.

Colorado consistently intermingles references to alleged knowledge on the part of Kansas concerning the effect of postcompact well pumping and knowledge merely of the extent of postcompact well pumping. Colo. Brief at 32 & n.28.[13] Knowledge of the existence of wells and extent of pumping in Colorado is insufficient to support a claim of laches. Colorado has not shown that Kansas knew or should have known of the *effects* of pumping on usable stateline flows.

1. Kansas Did Not Know Nor Should It Have Known of the Facts Giving Rise To Its Claim by 1956.

Colorado makes the extreme claim that "Kansas knew or should have known of the facts giving rise to its claim by 1956." Colo. Brief at 36. This extreme position is based on a 1956 USGS Report which discusses the recent increase in irrigation wells in Colorado. *See* Colo. Brief at 37. Colorado has failed to distinguish between knowledge of the existence of wells and knowledge of the effects of their pumping on usable flows at the stateline—the critical factor for determining compliance with the Compact. This failure on Colorado's part infects its whole discussion of this critical factual issue. *See* Colo. Brief at 36-48.

Colorado claims that Kansas has relinquished its right to relief because of certain deposition testimony of Howard Corrigan, a former water commissioner in the Garden City field office of the Kansas Division of Water Resources. Colo. Brief at 39-41. Mr. Corrigan was never a member of the Kansas delegation to

[13] Colorado suggests that "the Master apparently found that Kansas knew or should have known about the extent of post-compact well pumping in Colorado in 1968 . . . . " Colo. Brief at 32 n.28. There is no finding to this effect in the Master's Report.

the Arkansas River Compact Administration. *See* Colo. Brief at 39 n.33. Yet Colorado asserts that his state of knowledge, coupled with lack of complaint by the Kansas delegation, whose state of knowledge is unknown, should result in the loss of Kansas' compact rights. Not only is the knowledge of a water commissioner of the Garden City field office of the Kansas Division of Water Resources insufficient to cause a loss of Kansas' Compact rights, but also the extent of the local official's knowledge was itself insufficient to cause such a loss of rights. The deposition testimony established at most that the local water official was aware of well development in Colorado in the 1950s and that at some *unspecified* point in time he became aware that wells indirectly took water out of the river increasing transit loss.[14] However, this knowledge still falls well short of the knowledge of effects of pumping on usable flows at the state line needed to assess whether Colorado was violating Article IV-D of the Compact because of the numerous factors involved. This critical shortcoming was recognized by the Master.[15] It has also been recognized by the Colorado Supreme Court. *See Kuiper v. Atchison, Topeka & Santa Fe Ry.*, 581 P.2d 293 (Colo. 1978) (discussed *infra* at 22-23).

Nevertheless, Colorado claims that "[t]he Master misconceives the issue." Colo. Brief at 42. Colorado asserts that the issue is "whether Kansas knew or, in the exercise of reasonable diligence, should have known of facts giving rise to its claim before 1968." *Id.* This question is answered by the fact that Colorado itself did not know of a Compact violation prior to 1985 and did not believe any investigation of the possibility of a violation was

[14] The deposition took place Feb. 9, 1990, some six years after the Simons, Li Report was completed.

[15] "[T]he evidence is sketchy and does not demonstrate that these officials were aware of the number of wells, the extent of Colorado's pumping, or the impact or even potential impact of pumping on usable Stateline flows. Colorado frequently refers to 'well development,' but that alone does not violate the compact." Rep. vol. I at 164.

warranted. In 1975, for example, the Colorado State Engineer's office issued a report entitled "Stream Depletion By Wells in the Arkansas River Basin." In that report the Colorado State Engineer (the chief water official of Colorado) concluded that the "increasing use of ground water for irrigation in the Arkansas River basin since 1950 has affected stream flows in such a way as to deprive senior water users of a portion of their lawful water supply." Jt. Ex. 94 at 53 (R. vol. 16 at 25, 34), Pl. Reply App., Item 9. The study area for the report stretched from Canon City, above Pueblo, to the Colorado-Kansas state line. *Id.* Counsel for Colorado asked the State Engineer of Colorado in testimony in this case whether the effects on stream flows in the report "translate into a reduction in state line flows in your opinion." The State Engineer answered: "No, not in the evaluation that we did in this report." R. vol. 78 at 85, Pl. Reply App., Item 15. *See* Rep. vol. I at 161. Thus, it was not clear to the Colorado State Engineer that depletions of streamflows upstream in Colorado would result in reductions in flows at the state line, much less material depletions of usable stateline flows in violation of Article IV-D.

When the litigation in which the State Engineer submitted the 1975 Report reached the Colorado Supreme Court in 1978, that court assessed Colorado's knowledge as follows:

> When water in the aquifer is brought to the surface by a well and there is a consumptive use of that water by evaporation and evapotranspiration of phreatophytes, generally the surface supply is depleted by the amount of such consumptive use. The evidence and findings in this case demonstrate, however, that the restriction of wells does not necessarily result in a comparable increase in the supply of surface water. There are countereffects which offset or modify the depletive use of well water. Some of these are: variations in the amount of river flow; winter irrigation; reduction in evaporation and phreatophyte losses as a result of lowering of water tables; changes in ground water storage; extent of alluvium recharge occurring during wet cycles or as a result of widespread winter irrigation practices; and increased irrigation efficiencies. Other factors which may also be involved are increased ground water storage, stock ponds, municipal sewage lagoons, potholes, changes in side channel inflows, and cyclical fluctuations through wet and dry periods. *Kuiper v. Atchison, Topeka & Santa Fe Ry.*, 581 P.2d at 295-96 (Colo. 1978).

The Colorado Supreme Court's reasoning amply demonstrates why knowledge of increased pumping is not tantamount to knowledge of depletions at the state line. In addition to the considerations noted by the Colorado Supreme Court, there are additional considerations involved in determining whether Compact violations are likely to occur. The existence, amount and timing of transmountain imports from the Colorado River Basin and the return flows from such waters must be determined.[16] Whether flows being depleted are usable or not must be determined, which, in turn, requires that a definition of usability be determined, something that is still pending in the present litigation. Thus, many considerations come into play, and the rudimentary information that was elicited by Colorado regarding the knowledge of a local water official in Kansas falls far short of the information needed to establish knowledge of a material depletion of usable stateline flows.

Colorado strenuously maintains that it is not just what Kansas knew, but what it should have known, that is determinative for purposes of laches. Colo. Brief at 42. Colorado asserts in effect that Kansas should have made an investigation of the effects of

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[16] Article III-B limits the waters apportioned by the Compact to "waters originating in the natural drainage basin of the Arkansas River, including its tributaries, upstream from the state line, and excluding water brought into the Arkansas River Basin from other river basins." Rep. App., Ex. 1 at App. 2-3.

well pumping on usable flows at the state line in 1956. However at the October 4, 1985 meeting of the Compact Administration, Colorado's delegation rejected the demand of the Kansas delegation for an investigation of the effects of well pumping on usable stateline flows. Mr. J. William McDonald, Director of the Colorado Water Conservation Board and chief of the Colorado delegation to the Compact Administration submitted a memorandum on the subject which concluded as follows:

> [A]t this time, I cannot agree to undertake an investigation into well development in Colorado when the single and double-mass diagrams do not suggest that well development in Colorado has had an impact on usable stateline flows. Jt. Ex. 32 at 23 (R. vol. 14 at 12, 22, 26), Pl. Reply App., Item 7.

In addition, Mr. McDonald refused to accept the previous investigations of well pumping in Colorado. *Id.* at 15. Colorado obviously believed strongly that there was no reason to suspect that well pumping in Colorado could be causing violations of the Compact. It is therefore unreasonable to conclude that Kansas, the downstream state, should nevertheless have initiated its own investigation to determine those effects and should have done so many years before.

Colorado has the burden of proof on all elements of the defense of laches. *See, e.g., Costello v. United States*, 365 U.S. 265, 282 (1961); *White v. Daniel*, 909 F.2d 99, 102 (CA Fed 1990), *cert. denied*, 501 U.S. 1260 (1991); *A.C. Aukerman Co. v. R.L. Chaides Constr. Co.*, 960 F.2d 1020, 1032 (CA Fed. 1992). Colorado has failed in the most essential part of this burden—namely, to show that there was a delay before the filing of this action during which Kansas knew or should have known that it had a claim against Colorado under the Compact based on increased postcompact well pumping in Colorado. In fact, Kansas has affirmatively shown that when Kansas ultimately became aware of the probable existence of a Compact violation through

the Simons, Li Report, Jt. Ex. 88 at iv-v (R. vol. 13 at 117, 121, 127), Pl. Reply App., Item 8, in 1984, it made the conclusions available to Colorado without delay and requested a Compact investigation. Rep. vol. I at 153. That Compact investigation was declined by Colorado on the basis of assurances by Colorado that an investigation was not called for.[17] Jt. Ex. 32 at 22-23 (R. vol. 14 at 12, 22, 26), Pl. Reply App., Item 7.

2. Kansas Did Not Delay in Filing This Suit.

Colorado claims that "Kansas has no valid excuse for its lengthy delay." Colo. Brief at 48. The problem with Colorado's position is that there was no "lengthy delay" by Kansas. In fact, there was no delay at all. The period of delay for purposes of laches begins when the plaintiff knew or should have known of his claim against the defendant. *Studiengesellschaft Kohle v. Eastman Kodak Co.*, 616 F.2d 1315, 1326 (CA5 1980), *cert. denied*, 449 U.S. 1014 (1980); *Jensen v. Western Irrigation & Mfg.*, 650 F.2d 165, 168 (CA9 1980). Yet we have seen that in late 1985, only weeks before the filing of this action, Colorado itself was not aware of impacts on stateline flows that could be violations of the Arkansas River Compact, nor even the need to investigate such impacts. Therefore, there was no delay on Kansas' part and no reason to look for excuses for any delay.

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[17] In the early 1980s, the Colorado State Engineer went to the Colorado Supreme Court seeking reversal of a finding by the Water Court that postcompact wells in the Arkansas Valley in Colorado were depleting usable flows. *See People ex rel. Danielson v. Amity Mut. Irrigation Co.*, 668 P.2d 1368, 1370 & n.3 (Colo. 1983). This is a further indication that the Colorado State Engineer believed there were no compact violations in the early 1980s.

3. Colorado Was Not Prejudiced by Kansas' Alleged Delay.

Assuming, *arguendo*, that laches is a defense available to Colorado in this litigation and that there was an unexcused delay by Kansas in bringing this litigation, laches would nevertheless be inapplicable because there was no prejudice to Colorado as a matter of fact, as shown below.

a. There Was No Evidentiary Prejudice to Colorado.

Colorado complains that evidence on electric power records, on nonelectric power sources, from Kansas witnesses and on the Garden City streamflow gage, is missing, but could have been obtained if Kansas had complained earlier about the postcompact well pumping. Colo. Brief at 55-61.

The implication of the Colorado argument is that Colorado is bearing the risk of the lack of data with respect to a postcompact development initiated without obtaining sufficient information beforehand. This is as it should be. Colorado allowed the installation of many hundreds of wells without requiring those wells to have flow meters installed and without gaining the kind of pre-approval exemplified by the Trinidad Reservoir Operating Principles. Under these circumstances, it is Colorado that should bear the risk that later analysis will show that insufficient information was collected before going ahead. The risk should not be on the downstream state, which only suffered from this development and received no benefits and which did not have the access necessary to collect the data or the jurisdiction to require the collection of data. *Cf.* Kansas Brief in Support of Exceptions at 28-32.

Kansas has nevertheless suffered from the lack of data kept by Colorado. For instance, the Master has rejected the Kansas quantification of precompact pumping entitlement at 11,000 acre-feet per year in favor of the 15,000 acre-feet per year figure developed by the USGS. This increases the precompact pumping

entitlement by 144,000 acre-feet above the Kansas estimate for the 36-year study period (4,000 acre-feet per year × 36 years = 144,000 acre-feet). Colorado's failure to collect data has allowed Colorado to claim as much as 36,000 acre-feet per year of precompact pumping. Rep. vol. I at 62. If this extreme figure were accepted, Colorado's precompact pumping entitlement would be 756,000 acre-feet above the Master's recommended level (21,000 acre-feet per year × 36 years = 756,000 acre-feet).

The Master rejected Colorado's assertion that Kansas' alleged failure to complain in a timely fashion had made it difficult for Colorado to defend itself and determine key factual issues because of a lack of data:

> However, I doubt that complaints from Kansas realistically would have made any difference in Colorado's data collection system. I note that the 1968 W. W. Wheeler Report which was authorized by the Colorado legislature recommended that 'Accurate and continuous discharge records be obtained of major tributary inflow,' and that 'Recorders be installed on all wells.' Jt. Exh. 92 at vii. Yet nothing substantial was done. Indeed, these recommendations still have not been implemented. Rep. vol. I at 148.

Colorado continued to do nothing substantial to collect additional data after the complaint was made by Kansas or even after this litigation was initiated by Kansas. Even after Colorado became aware as a result of its own calculations which are in evidence that its postcompact wells were violating the Compact, Colorado took no substantial steps to curtail the pumping. Colorado claims that it did respond to the W. W. Wheeler Report and that the Master's statement quoted above is "inaccurate and unfair." Colo. Brief at 59. Colorado supports this statement by citing to streamflow gages. *Id.* at 60. No mention is made of the failure to meter wells, nor of the fact that the operation of the Big Sandy gage

(on the biggest tributary below John Martin Reservoir) was terminated in 1982. *See* Colo. Brief at 60.

Colorado also purports to have been prejudiced by the lack of witnesses who could have established the knowledge that Colorado needed to establish its laches defense. Colo. Brief at 60-61. Aside from the circularity of reasoning involved in this position, Colorado has not established that the persons it claims had knowledge of Compact violations were persons whose knowledge would have the legal effect of precluding a claim of the State of Kansas under the Compact.

b. There Was No Economic Prejudice to Colorado.

In *Costello v. United States*, 365 U.S. 265 (1961) the Court noted that one element of laches is proof of prejudice to the party asserting the defense. *Id.* at 282. As in that case, the passage of time since Colorado began violating the Compact seems "plainly to have worked to [Colorado's] benefit, not to [its] detriment." *Id.* The Court pointed out that Congress had not seen fit to enact a time bar applicable to that proceeding and determined that depriving the petitioner of his citizenship after 27 years was not unreasonable because he had never been entitled to that citizenship. *Id.* at 283-84. Likewise, as the Master pointed out, Rep. vol. I at 156-59, Colorado farmers obtained economic value from their wells over a period that began some 45 years ago in 1949. The passage of time has "permitted the benefits of those wells to be increasingly enjoyed and such investments amortized." *Id.* at 157. Moreover, the Colorado testimony is that not much was invested in the wells and that they were not maintained at high levels of efficiency. *See* R. vol. 63 at 188-90, Pl. Reply App., Item 12; vol. 65 at 69-70, Pl. Reply App., Item 13.

Colorado states, "Economic prejudice may arise where the defendant will suffer the loss of monetary investments or incur damages which likely would have been prevented by earlier suit." Colo. Brief at 54. This could be the case where an equivalent

alternative water supply had been rejected in favor of the wells that have now been found to be illegal by the Master. However, there was no cheaper alternative. The fact that the farmers found it preferable to throw the switch on their wells rather than procure additional water supplies from another source is evidence that it was the cheapest alternative available. Indeed, the farmers in Colorado turned on their wells rather than buy water from the Fryingpan-Arkansas Project.[18] As stated by Colorado, the expectation had been that transmountain imports from the Colorado Basin would average 196,000 acre-feet per year. Colo. Brief at 7. However, the expected demand for transmountain water did not materialize as expected from the farmers who now had the opportunity to obtain water by well pumping.[19] Thus, Colorado did not give up an equal opportunity to obtain water from another source in favor of wells, but rather has enjoyed the cheaper source of water in increasing amounts.

The Colorado contention is essentially that it would have been cheaper to have had no postcompact wells at all than to have pumped them as they did. Nothing in the record supports such an implausible contention. In response to the Master's conclusion that the passage of time permitted the benefits of wells to be increasingly enjoyed and such investments amortized, Colorado says, "This analysis confuses benefits of wells to well owners with prejudice to Colorado." Colo. Brief at 62. The confusion, however, rests not with the Master but with Colorado. Article VII-A of the Arkansas River Compact provides as follows:

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[18] The Fryingpan-Arkansas Project is a project of the U.S. Bureau of Reclamation. The Project was authorized by Congress in 1962. Act of Aug. 16, 1962, P.L. 87-590, 76 Stat. 389. One purpose of the Project was to import water from the Colorado River Basin for use in the Arkansas River Basin. *See id.*

[19] On average, transmountain imports have amounted to only 120,000 acre-feet annually since 1972. Rep. vol. II at 49; Colo. Brief at 8 n.8.

> A. Each State shall be subject to the terms of this Compact. Where the name of the State or the term "State" is used in this Compact these shall be construed to include any person or entity of any nature whatsoever using, claiming or in any manner asserting any right to the use of the waters of the Arkansas River under the authority of that State. Rep. App. Ex. 1 at App. 10-11.

This provision of the Compact removes any doubt that the benefits of individual well owners in Colorado are imputed to Colorado under the Compact. It is therefore nonsensical to try to draw a distinction between benefits to Colorado water users and benefits to the State of Colorado.

4. Laches Should Not Bar a Claim for Damages Before 1985.

Colorado would essentially bar all retrospective remedies that Kansas has under the Compact and the decisions of this Court. This suggestion by New Mexico in the Pecos River litigation was rejected by the Court, as discussed *supra* at 12.

II. Article IV-D Limits Well Pumping in Colorado to 15,000 Acre-Feet Per Year.

A. Precompact Wells Should At Least Be Limited to Pumping the Highest Amount Pumped in the Years During Which the Compact Was Negotiated.

Colorado begins its discussion of the Colorado position that it is entitled to pump 50,000 acre-feet per year based on precompact pumping, by criticizing the Master for relying on "what he believed the Compact negotiators had intended." Colo. Brief at 66. Colorado's contention is that the Master erred in ignoring

the subsequent practice of the parties to the Compact.[20] In essence, Colorado would like the Court to change the Compact based on Colorado's view of the actions of the parties since the adoption of the Compact. The Court, however, has made abundantly clear in the past that this cannot be done. *See, e.g., Texas v. New Mexico*, 462 U.S. 554, 564 (1983)("[U]nless the compact to which Congress has consented is somehow unconstitutional, no court may order relief inconsistent with its express terms."). Much of the Colorado argument is based on Colorado's allegation that Kansas made no objection to well development in Colorado nor prevented such development in Kansas. This argument assumes that Kansas knew or should have known of the effects of pumping on Colorado's Compact obligations to Kansas. As has been shown, this position by Colorado is untenable as a matter of fact. *See supra* at 19-24. Also, what Kansas was doing with regard to the administration of wells in Kansas is an issue that might be of relevance in an equitable apportionment proceeding, but not in a compact enforcement proceeding such as the present one.

Colorado contends that its wells should be allowed to pump to the full extent of their rights as recognized by Colorado state law. As part of this argument, Article VI-A(2) of the Compact is put forward by Colorado as a protection against the Master's interpretation of the Compact. Colo. Brief at 68-69. Article VI-A(2) provides as follows:

> *Except as otherwise provided*, nothing in this Compact shall be construed as supplanting the administration by Colorado of the rights of appropriators of waters of the Arkansas River in said State as decreed to said appropriators by the courts of Colorado, nor as interfering with the distribution among said appropriators by Colorado, nor as curtailing the diversion and

[20] Colorado's reference to "subsequent practice" is essentially a reassertion of its laches argument that Kansas delayed too long in filing the litigation. Colo. Brief at 66-67.

> use for irrigation and other beneficial purposes in Colorado of the waters of the Arkansas River. Rep. App., Ex. 1 at App. 10 (emphasis added).

Colorado tends to overlook the introductory emphasized phrase of Article VI-A(2). "Except as otherwise provided" refers at least to Article IV-D of the Compact and its proviso that the waters of the Arkansas River must not be materially depleted in usable quantity or availability. In other words, Article IV-D cannot be circumvented by reliance on Article VI-A(2). The supremacy of Article IV-D is assured by the concessive introductory phrase of Article VI-A(2).

Colorado claims that "nothing in Article IV-D states that pre-compact wells in Colorado are limited to pumping the amounts that were pumped during the pre-compact period." Colo. Brief at 69. Colorado claims that the Master "has read into Article IV-D" this limitation. *Id.* This argument, however, fails to take account of the plain meaning of the language that is included in Article IV-D. That Article prohibits "future beneficial development . . . which may involve construction of dams, reservoir, and other works for the purposes of water utilization and control, as well as the *improved or prolonged functioning of existing works*" if such development materially depletes the waters of the Arkansas River in usable quantity or availability. Rep. App., Ex. 1 at App. 5. The increases in pumping were certainly "future" at the time of the Compact. The increase in pumping of precompact wells could only be achieved through prolonging the functioning of those wells or improving the functioning of those wells. Colorado is asking this Court to accord Colorado the right to continue to enjoy the improved and prolonged functioning of its precompact wells. To do so would be to order relief inconsistent with the terms of the Compact, which this Court has refused to do. *Texas v. New Mexico*, 462 U.S. 554, 564.

Colorado bases its argument on precompact entitlement in part on the fact that the provisions of Article V-H refer to the transfer of "ditch diversion *rights*." Colo. Brief at 69 (emphasis

in Colo. Brief). This Article places special requirements on transfers of surface water rights from below John Martin Reservoir to above the reservoir. *See* Rep. App., Ex. 1 at App. 9. Colorado argues that the reference to "rights" in Article V-H means that Article IV-D must also be similarly interpreted. This argument does not make sense, however, because the subject matter of the two articles is different. Article IV-D is directed at future developments, while Article V-H is directed at the transfer or increase of existing surface water rights.

Colorado seems to believe that the use of the word "rights" is significant. The use of the word "rights" in Article V-H *is* significant, but not for the reason that Colorado asserts. Its use in Article V-H shows that the negotiators intentionally refrained from using "rights" in Article IV-D. Its obvious absence from Article IV-D shows that their purpose was to prevent further depletions of usable flow regardless of whether someone then or later could make a claim of "right" under Colorado law. The same word was not used in Article IV-D because the purpose of IV-D was different, namely, to allow future development, including the improved or prolonged functioning of existing works, provided that such development did not materially deplete the waters of the Arkansas River in usable quantity or availability for use. *See* Rep. vol. II at 190-95. The Master makes the fundamental point that to accept the Colorado position is to reallocate the waters of the Arkansas River in a massive amount, contrary to the intentions of the negotiators of the Compact. *Id.*

Colorado continues to argue that its "pre-compact wells should be permitted to pump in accordance with Colorado law." Colo. Brief at 72. This is a restatement of the Colorado position that "the rights of the precompact well appropriators, as decreed by the Colorado courts, are 'binding on Kansas'." Rep. vol. II at 193.

In *Hinderlider v. La Plata River & Cherry Creek Ditch Co.*, 304 U.S. 92 (1938), another case in which Colorado appropriators claimed that their decreed Colorado water rights superseded an interstate compact (the La Plata River Compact between Colo-

rado and New Mexico), the Court, after first assuming that the decreed water right involved was a property right indefeasible so far as Colorado was concerned, stated:

> But *the Colorado decree could not confer upon the Ditch Company rights in excess of Colorado's share of the water of the stream*; and its share was only an equitable portion thereof.
>
> The claim that on interstate streams the upper State has such ownership or control of the whole stream as entitles it to divert all the water, regardless of any injury or prejudice to the lower State, has been made by Colorado in litigation concerning other interstate streams, but has been consistently denied by this Court. The rule of equitable apportionment was settled by *State of Kansas v. Colorado*. It was discussed again in *Wyoming v. Colorado*, where the Court said: "The contention of Colorado that she as a state rightfully may divert and use, as she may choose, the waters flowing within her boundaries in this interstate stream, regardless of any prejudice that this may work to others having rights in the stream below her boundary, cannot be maintained. The river throughout its course in both states is but a single stream, wherein each state has an interest which should be respected by the other. A like contention was set up by Colorado in her answer in *Kansas v. Colorado* and was adjudged untenable. Further consideration satisfies us that the ruling was right." 304 U.S. at 102-03 (citations omitted).

Later in the same opinion the Court stated that an apportionment of an interstate stream by compact or decree of the Court "is binding upon the citizens of each State and all water claimants, even where the State had granted the water rights before it entered into the compact." *Id.* at 106. Thus, the fact that certain water rights might be sanctioned by Colorado decrees (most of

which were issued in unopposed proceedings long after the claimed initiation of use, Rep. vol. II at 191), is of no consequence to the Compact allocation between Colorado and Kansas of the waters of the Arkansas River. The Colorado argument, based on the discredited notion that Kansas is bound by the Colorado water court decrees, should be rejected by the Court as it was by the Master.

B. The USGS Estimates for the 1940s Are Reasonable.

1. Both Colorado and Kansas Experts Relied on the 1970 USGS Report.[21]

As Colorado recognizes, both states relied on the United States Geological Survey 1970 Report for power coefficients to estimate use during the 1964-68 period. Colo. Brief at 75. The use of power coefficients was made necessary because Colorado has not required the use of flow meters to measure the amounts of water pumped by wells. However, Colorado claims that "experts for neither state relied on the USGS pumping estimates for the period 1940-63 in the report." Colo. Brief at 75. This is not true. Mr. Book testified that he relied on the figures determined by the USGS for the earlier years as a check against the work that he did based directly on power records. This comparison confirmed for him that the study area for the USGS figures was somewhat larger than the study area for this case and confirmed the validity of the 11,000 acre-foot figure that he had determined. Tr. vol. 125 at 59-61, Pl. Reply App. Item 17. Just as importantly, Kansas relied on the USGS figures to conclude that the pumping

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[21] T.J. Major, R.T. Hurr, and John E. Moore, 1970, "Hydrogeologic Data for the Lower Arkansas River Valley, Colorado," Colorado Water Conservation Board, Ground Water Basic Data Release No. 21, Jt. Ex. 66 (R. vol. 15 at 21, 25, 30). For a description of this report, see Rep. vol. I at 158. As the title of the report reveals, the report was done by the USGS in cooperation with Colorado.

in 1948 was equal to or greater than all previous years back through 1940. *Id.*

2. Colorado's Witness Defended the USGS Pumping Estimates Before the Special Master.

Colorado called as its witness the lead author of the 1970 USGS Report, BDR-21, Thomas J. Major, for purposes of testifying on that report. As the Master points out, Mr. Major, a 26-year USGS employee, "staunchly defended the accuracy of the USGS's pumping estimates." Rep. vol. II at 187. Mr. Major was surprised to learn during his testimony that, although Colorado accepted some of the results of the report, Colorado was claiming nevertheless that the precompact pumping figures in the report were unreliable. In particular, he was not aware that Colorado was claiming that the highest pumping during the 1940s was 15 times greater than the USGS figure for the same year. R. vol 129 at 34, 61-62, Pl. Reply App., Item 18. Nevertheless, he defended the accuracy of the report's figures. *Id.* Thus, Colorado's position amounts to a refusal to accept verification by its own witness and lead author of the USGS Report of the USGS precompact pumping figures. Moreover, Colorado claims that Mr. Major was not qualified as an expert in making pumping estimates. It is technically true that Colorado did not present Mr. Major as an expert in making pumping estimates. However, he was called by Colorado to testify on the report and he was sufficiently expert to be appointed lead author of the study by the U.S. Geological Survey. Colorado asserts that the "basis, and the only basis, for Mr. Major's defense of the accuracy of the USGS pumping estimates was that those figures were subject to the normal USGS peer review and checking and he had no reason to doubt Mr. Hurr's work." Colo. Brief at 76-77. It would seem that there is hardly a higher recommendation for the accuracy of figures than that contained in the Colorado statement. It was subject to "normal USGS peer review and checking" and it was done by an independent federal agency without the pressure of litigation. It

is hard to see how such information could come more highly recommended.

3. The Supreme Court of Colorado Adopted Estimates Equivalent to the USGS Estimates.

Colorado not only criticizes the USGS, but its own Supreme Court for concurring with the USGS figures for precompact pumping. Colo. Brief at 77. Colorado claims that the Colorado Supreme Court's use of the precompact figures was an uncritical use and does not establish that they were reasonable. Colo. Brief at 77. On the contrary, it is best to rely on figures accepted by Colorado when there was no pressure of trial advocacy as there is in this case.

In *Fellhauer v. People*, 447 P.2d 986 (Colo. 1968), the Colorado Supreme Court said, "In 1940 only 2,000 acre feet were being pumped from wells in the Arkansas Valley." *Id.* at 991. In the present case, Colorado claims the pumping in 1940 was 36,837 acre-feet. Rep. vol. II at 187. The USGS figure was 2,000 acre-feet for 1940. *Id.* at 185.

4. The Colorado State Engineer Relied on the USGS Estimates in His 1975 Report.

Colorado admits that the Colorado State Engineer, in a report prepared in 1975 for purposes of presentation to the Colorado Water Court in support of regulations, relied on the USGS pumping figures. Colo. Brief at 78. The former State Engineer testified in support of his report under oath in the 1975 proceeding in Colorado water court. Pl. Ex. 514, vol. I at 213-14 (R. vol. 17 at 5, 7), Pl. Reply App., Item 2. Even in the present proceeding he testified that the estimates were the best his staff could achieve at the time of the report. R. vol. 77 at 30-31, Pl. Reply App., Item 14. The USGS pumping figures relied upon by the Colorado State Engineer himself and other state and federal agencies for years, have become inconvenient under the present

circumstances and Colorado is marshalling all of its powers to repudiate these figures, which up to now it has always considered acceptable.

5. Mr. Book Relied in Part on the USGS Estimates.

Colorado states that Dale Book, one of Kansas' expert witnesses, "did not rely on the USGS estimates in making the Kansas estimates" for 1948. Colo. Brief at 79-80. While it is true that Mr. Book developed estimates for 1948 independently based on power records and pumping coefficients, since no water meters were required by Colorado, Mr. Book relied on the USGS figures for the conclusion he drew that 1948 pumping was equal to or greater than previous pumping back through 1940. R. vol. 125 at 59-61, Pl. Reply App. Item 17.

6. The Colorado Precompact Pumping Estimates Are Not Reasonable.

Colorado's highest actual precompact pumping amount is fifteen times larger than the USGS figure for the same year (1940). *See* Rep. vol. II at 182, 185. If the USGS figures for precompact pumping are reasonable, the Colorado figures are not.

Colorado insists that there is a problem with the USGS pumping estimates because they are inconsistent with power records from the same period. Colo. Brief at 80-81. What Colorado fails to point out is that in the 1975 Colorado State Engineer report, the Colorado State Engineer published his own precompact pumping figures, which agreed in most respects with the USGS precompact pumping figures, and side-by-side published the power use data to which Colorado now refers as the basis for challenging the pumping figures of the Colorado State Engineer and the USGS. *See* Jt. Ex. 94, Table 7 at 22 (R. vol. 16 at 25, 34), Pl. Reply App., Item 9. This shows that the Colorado State Engineer was fully aware of the alleged discrepancies between

the power records and the USGS pumping figures. Nevertheless, he published the pumping figures without qualification. The power figures that Colorado claims are inconsistent are thus not an item of newly discovered evidence, but have been available throughout the several decades over which the USGS figures have been accepted. There is no reason to begin to doubt those figures in this proceeding.

7. Virtually Nothing Is Known About the Power Figures, but the Pumpage Estimates Have Been Accepted by Colorado and the U.S. Government for Many Years.

Colorado has been unable to explain the errors claimed to exist in the USGS estimates. Colorado has accepted the alleged discrepancies between the power figures and the pumping figures until now. In 1975, the former Colorado State Engineer, in his sworn testimony, explicitly discussed both the power figures and the pumping figures without suggesting that there was any reason to doubt the pumping figures. *See* Pl. Ex. 514, vol. I at 213-14, (R. vol. 17 at 5, 7), Pl. Reply App., Item 2.

8. Lack of Discussion of Pumping During the Compact Negotiations Suggests That Pumping Could Not Have Been Large.

Colorado contests the following statement by the Master:

> Current well pumping in Colorado appears simply not to have been a matter of concern to the compact commissioners. Had pumping been of any appreciable magnitude, I cannot believe that such use of water would not have surfaced in the engineering committee report and the compact negotiations. Absence of such discussion leads to the conclusion that pumping at that time was not large, a conclusion which is supported by

> other evidence in the case. Certainly, the compact commissioners did not foresee the technological breakthrough of the turbine pump and other conditions that led to the great increase in pumping which began in the 1950s. That is not to say that the compact language is not broad enough to cover depletions caused by pumping. I believe that it is, and the intent of the commissioners was to protect against material depletions from any cause. However, during the compact negotiations the specific threat appeared to be from future construction of dams and reservoirs, not from pumping. Rep. vol. I at 101-02.

Colorado begins its attempt at refutation by stating that "the Compact Commissioners clearly knew that there was well pumping in both states." Colo. Brief at 83. First, it is pumping in Colorado that is important for this case, not pumping in Kansas. Yet almost all the citations given by Colorado refer to pumping in Kansas. Second, the statements regarding well development in Colorado are scanty and completely unquantified. *See* Def. Ex. 623 at 29-30 (R. vol. 10 at 42, 48), Pl. Reply App., Item 4. Nor is significant pumping generally indicated. *See, e.g.*, Pl. Ex. 205A (R. vol. 4 at 30), Pl. Reply App., Item 1, and other sources cited by Colorado. Colo. Brief at 83. Further, as to individual statements cited, there is no evidence that they were disseminated. *See* R. vol. 10 at 42-43, Pl. Reply App., Item 11.

Colorado then argues that the Engineering Committee Report from the Compact negotiations does not show, by its exclusion of pumping, that the Colorado estimates of pumping for that time are unreasonable. Colo. Brief at 83. In the paragraph in the "Interim Report of Committee on Engineering Data and Studies to Colorado-Kansas Arkansas River Compact Commission," to which Colorado refers (*id.*), which is a paragraph that separates "necessary data" that would be tabulated from "unnecessary data" that would not be tabulated, it is stated, "Irrigation supplies derived from pumps in both states are not included in the tabulated

diversions." Jt. Ex. 5 at 3, (R. vol. 15 at 12), Pl. Reply App., Item 5. The Engineering Committee was thus aware that pumping was occurring in Colorado at that time, but considered it so insignificant as to be unnecessary to include in its work. The Master's conclusion that pumping was small enough in amount to disregard during the time of the Compact negotiations seems to be convincingly borne out by the report of the Engineering Committee.

Colorado also argues that "the absence of discuss on of pumping indicates that the Compact Commissioners assumed that rights of pre-compact well owners would be administered in accordance with state law." Colo. Brief at 83-84. On the contrary, there was great uncertainty as to what the Colorado groundwater law was at that time and as to how Colorado would administer its wells. Colorado elicited this conclusion from Dr. Littlefield during cross-examination. R. vol. 10 at 46-47, Pl. Reply App., Item 11. In short, there seems to be no basis at all for Colorado's suggestion that silence on pumping indicated that the Compact Commissioners assumed that rights of precompact well owners would be administered in accordance with state law. Moreover, that conclusion has little to do with the Master's point, which is that the lack of discussion indicates an understanding on the part of the Commissioners that pumping was small enough that it could be ignored.

9. Colorado's Estimates Are Inconsistent With All Prior Determinations of Pumping for the 1940s.

Colorado's estimates of pumping in the 1940s in the Arkansas Valley in Colorado in this case are inconsistent with all prior federal and state agency, legislative and court determinations of that pumping. The division of the foregoing argument into small subsections in order to match the Colorado brief tends to obscure the overriding fact that the Colorado figures for precompact pumping are inherently unreasonable. According to Colorado, pumping tends to increase as one goes back toward the beginning of the 1940s, reaching a maximum amount in 1940 some fifteen

times larger than the USGS figure for that year and fifteen times higher than the figure adopted by the Colorado Supreme Court, the Colorado Water Conservation Board and the Colorado State Engineer. *See*, Rep. vol. II at 186-88. In order to achieve this outlandish result, Colorado asserted that well efficiencies were higher in the early 1940s than they were in the late 1940s, despite the fact that more efficient turbine pumps began to replace centrifugal pumps in the late 1940s. *Id.* at 189. The Master described this dubious Colorado effort as follows:

> For whatever reason, the result of the Colorado approach is to make pumping in 1940 the highest amount in the whole decade of the 1940s. This result seems questionable in light of all the earlier studies showing increasing pumping throughout the 1940s, and the new wells which continued to be drilled throughout the decade. Colorado's own report puts the number of additional wells drilled between 1941 and 1949 at 122. Jt. Ex. 94 at 19. A lower rather than higher estimate of early 1940s pumping is also supported by the fact that during the compact negotiations the engineering committee made no effort to include pumping as part of the diversion data, or indeed at all. Jt. Ex. 5 at 3. The historic division of flow between the two states was considered on the basis of surface diversions alone. Rep. vol. II at 190 (footnote omitted).

There is thus no viable basis on which to reject the Master's recommendation with respect to the precompact pumping entitlement of Colorado.

III. Increases in Stateline Flows Resulting From the 1980 Operating Plan Were Separately Bargained For and Should Not Offset Compact Violations.

Colorado challenges the Master's conclusion that the 1980 Operating Plan[22] provided both states with benefits bargained for separately from the Compact and was not intended to offset Compact violations by Colorado. Colo. Brief at 85-91.

One does not have to rely on inferences from the 1980 Operating Plan to ascertain that its intent was not to offset violations of the Compact. This intent is stated directly in Article VI:

> Adoption of this resolution does not prejudice the ability of Kansas or of any Colorado ditch to object or to otherwise represent its interest in present or future cases or controversies before the Administration or in a court of competent jurisdiction. Rep. App., Ex. 10 at App. 116.

It is hard to imagine a stronger expression of intent not to interfere with the claim of Kansas in a proceeding such as the present one. Although the Master quotes this provision in his decision, Colorado says not a word about it in its brief. *See* Colo. Brief at 85-91. Indeed, there is little that can be said to refute this unequivocal expression of intent. Likewise, neither of the other two "whereas" clauses of the 1980 Operating Plan refers even indirectly to the existence of Compact violations or to the effect of wells. *See* Rep. App., Ex. 10 at App. 116.

Colorado's suggestion that the purpose of the 1980 Operating Plan was to offset well effects is inherently implausible. Colorado alleges in the same brief in support of its exceptions that Kansas never complained about wells in Colorado until 1984. Colo. Brief at 32-63. The Colorado position has all the earmarks of a position

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[22] The 1980 Operating Plan is contained in the Appendix of the Master's Report as Exhibit 10 at App. 107.

developed after-the-fact for purposes of litigation. One can ask how the purpose now claimed for the 1980 Resolution was never even uttered by the parties in the course of their negotiation and adoption of that resolution or for years afterward. When Kansas finally became aware of the effects of the wells by virtue of the Simons, Li Report and brought that realization to the Compact Administration, Colorado denied the existence of well effects on Colorado's Compact obligations. Jt. Ex. 32 at 15, 22-23, (R. vol. 14 at 12, 22, 26), Pl. Reply App., Item 7. In fact, the 1980 Operating Plan itself was suggested by Colorado as a possible reason for the admitted decline in usable stateline flows. *Id.* at 22.

Colorado claims that general principles of contract law support its position. Colo. Brief at 90. This assertion is incorrect. Colorado claims that general principles of contract law provide that "the injured party is not entitled to recover damages which it in fact avoided." *Id.* The fundamental point that Colorado overlooks and fails to explain is that the 1980 Operating Plan is a separate agreement between the states, subject to cancellation each year, which provided independent benefits to both states.

Colorado puts much emphasis on the first "whereas" clause of the 1980 Operating Plan, which reads as follows:

> WHEREAS, the Arkansas River Compact Administration, hereinafter referred to as the Administration, recognizes that, because of changes in the regime of the Arkansas River, the present operation of the conservation features of John Martin Reservoir does not result in the most efficient utilization possible of the water under its control. Rep. App., Ex. 10 at App. 107.

Although the Colorado claim seems to be that the phrase "changes in the regime of the Arkansas River" refers to depletions by Colorado wells in violation of the Compact, the reference here would seem to be simply to the drought conditions that the Arkansas Valley was experiencing at the time. In fact, Colorado assured Kansas that this was the case. Jt. Ex. 32 at 22 (R. vol. 14 at 12, 22, 26), Pl. Reply App., Item 7. As a result, as Colorado admits, "releases from John Martin for Kansas did not produce an equivalent in Stateline flow." Colo. Brief at 88. In addition to referring to the current drought conditions, the first whereas clause also refers to "efficient utilization" of the conservation features of John Martin Reservoir. This is addressed by the account system set up by the 1980 Operating Plan. Thus, the references contained in the whereas clause cited by Colorado are completely consistent with the express provisions of the 1980 Operating Plan and provide no plausible basis for Colorado's claimed, unspoken purpose asserted for the first time in this litigation. The Master concluded as follows:

> The 1980 Operating Plan provided benefits to both Kansas and Colorado which were separately bargained for. There is no evidence to support the claim that the benefits to Kansas were in settlement of its well claims. Colorado received ample consideration under the agreement for the 1980 plan without a waiver of Kansas' well claims. The benefits received by Kansas under the plan should not be offset against compact violations, and should not be a bar to any of the Kansas claims in this case. Rep. vol. II at 180-181.

Colorado has offered no persuasive reason to show that the Master is not completely correct.

IV. Kansas Should Not Be Required to Prove a Breach of the Compact by Clear and Convincing Evidence.

The Master premises his conclusion that the preponderance of the evidence burden of proof applies to the enforcement of Article IV-D in this case on the recent case of *Nebraska v. Wyoming*, 113 S. Ct. 1689 (1993). Rep. vol. I at 65-70. Colorado

challenges the Master's conclusion but curiously neglects to address the Master's reliance on that case.

In *Nebraska v. Wyoming*, the Court articulated a theretofore implicit distinction in its previous cases. A "clear and convincing" standard had developed for use in equitable apportionment cases in other interstate cases requesting injunctive relief not based on a compact. *See, e.g. Missouri v. Illinois*, 200 U.S. 496 (1906), *Colorado v. Kansas*, 320 U.S. 383 (1943). On the other hand, no such higher standard had ever been articulated or even intimated in the previous compact enforcement cases. *See, e.g., Texas v. New Mexico*, 462 U.S. 554 (1983); 482 U.S. 124 (1987); *Oklahoma v. New Mexico*, 501 U.S. 221 (1991). The Master recognized that to establish a burden of proof that was unusually high would tend to favor one state over another and violate the ideal of federalism that each state is on an equal footing with all other states. *See* Rep. vol. I at 68-69.

In *Nebraska v. Wyoming*, the Court established a clear distinction between "an application for *enforcement* of rights already recognized in the decree" and an application for "*modification* of the decree." 113 S. Ct. at 1694 (emphasis in original). Thus, if an interstate compact is at least equivalent under these circumstances to a decree of this Court, the burden of proof question would seem to be resolved in favor of the preponderance standard. The Master believed that it was. Rep. vol. I at 69-70. This would also seem to be consistent with the Court's decision in *Hinderlider v. La Plata River & Cherry Creek Ditch Co.*, 304 U.S. 92 (1938) in which the Court said:

> Whether the apportionment of the water of an interstate stream be made by compact between the upper and lower States with the consent of Congress or by a decree of this Court, the apportionment is binding upon the citizens of each State and all water claimants, even where the State had granted the water rights before it entered into the compact. 304 U.S. at 106.

Thus, compacts adopted pursuant to Article I, Section 10, Clause 3 of the Constitution are not inferior to decrees of this Court with respect to their binding nature. This would suggest that they are at least equal with respect to the closely related issue of the standard of proof necessary to show a violation. Colorado seeks to draw a distinction between a decree and a compact, however. The basis for Colorado's distinction is, essentially, that a judicial decree is created by a court proceeding and a compact is not. However, this Court in *Hinderlider* refused to make that very distinction.

Colorado cites several grounds for its position that the standard of proof should be clear and convincing. It first cites the "quality of the parties." Colo. Brief at 95. There is language in the cases as Colorado suggests; however, none of those cases involve requests for compact enforcement; rather, they involve requests for equitable apportionment or other injunctive relief in the first instance. *See*, Colo. Brief at 94-95, *quoting, e.g., Colorado v. Kansas*, 320 U.S. 383 (1943); *Washington v. Oregon*, 297 U.S. 517 (1936). Although these cases did have states as parties, the states were appearing for a very different purpose. The purpose in those cases was to consider whether there should be intervention in the rights of other states for the very first time.

Second, Colorado claims a need for the clear and convincing standard because of "the importance of a just resolution of controversies between states." Colo. Brief at 95. On the contrary, placing a higher burden on one state would eliminate the level playing field contemplated by the framers of the Constitution.

Third, Colorado claims that the clear and convincing standard is necessary "to guard against erroneous factual conclusions."*Id.* On the contrary, that standard would promote erroneous factual conclusions. The policy in favor of higher burdens in other cases is to guard against erroneous factual conclusions *against the defendant*, a policy not appropriate here in view of the equal status of states before the Court. "A preponderance-of-the-evidence standard allows both parties to 'share the risk of error in roughly equal fashion.' Any other standard expresses a

preference for one side's interests." *Herman & MacLean v. Huddleston*, 459 U.S. 375, 390 (1983) (citations omitted).

Colorado also argues that a compact can be more flexible than a decree because it can address matters which are not the subject of a present controversy, including future developments. Colo. Brief at 97. Here again, the purported distinction is not helpful. Whereas Colorado compares a decree with a compact with regard to their creation, the comparison that should be made is between the enforcement of a decree and the enforcement of a compact. Once the question is properly phrased, the Colorado distinction disappears.

Colorado criticizes the Master, saying, "[T]he Master stated the higher standard penalizes downstream states which will invariably be the party which is required to carry the burden . . . . This is not correct." Colo. Brief at 98. But Colorado has misquoted the Master. The Master's statement was actually, "Second, on an interstate stream, the downstream state will *normally* be the complaining party." Rep. vol. I at 68 (emphasis added). Not only is this generally true of interstate water controversies, *see, e.g., Kansas v. Colorado*, 185 U.S. 125 (1902); *Missouri v. Illinois*, 200 U.S. 496 (1906); *North Dakota v. Minnesota*, 263 U.S. 365 (1923); *but see Colorado v. New Mexico*, 459 U.S. 176 (1982); *Colorado v. Kansas*, 320 U.S. 383 (1943), but it is especially true of compact or decree enforcement cases. *See Texas v. New Mexico*, 462 U.S. 554 (1983); *Oklahoma v. New Mexico*, 501 U.S. 221 (1991); *Wyoming v. Colorado*, 309 U.S. 572 (1940).

Colorado cites an equitable apportionment case, *Colorado v. New Mexico*, 459 U.S. 176 (1982); 467 U.S. 310 (1984), as the basis for its criticism. Colo. Brief at 98. But the issue here is not what the burden of proof should be in a suit seeking to establish an equitable apportionment of an interstate stream, as in *Colorado v. New Mexico*. Rather, this case seeks to enforce an equitable apportionment already effected by the Arkansas River Compact. Colorado can cite no reported case in which the downstream state was not the complaining party in a suit seeking to enforce a compact. *See, e.g. Texas v. New Mexico*, 462 U.S. 554 (1983); *Oklahoma v. New Mexico*, 501 U.S. 221 (1991). This is also true of suits to enforce interstate decrees entered by this Court. *See, e.g., Nebraska v. Wyoming*, 113 S. Ct. 1689 (1993); *Wyoming v. Colorado*, 309 U.S. 572 (1940). The downstream state will normally be the complaining state in a compact or decree enforcement action simply because of the temptation for the upstream state to withhold water that it is not entitled to. The Colorado position, if adopted, would strengthen that temptation and thereby encourage states to violate compacts—an undesirable result indeed.

CONCLUSION

Based on the foregoing, Kansas requests that Colorado's Exceptions to the Report of the Special Master be denied.

Respectfully submitted,

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APPENDIX

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Reply Appendix Item 1

Excerpt from Pl. Ex. 205A

George S. Knapp Letter to W. E. Stanley,
July 13, 1940,
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Kansas State Historical Society, Topeka, Kansas
[08-15-00285] (Certified Copy)

KANSAS STATE BOARD OF AGRICULTURE

J.C. MOHLER • SECRETARY
STATE HOUSE • TOPEKA

July 13, 1940

Mr. W. E. Stanley,
830 First National Bank Building,
Wichita, Kansas.

RE: Colorado vs. Kansas

Dear Gene:-

• • • • •

I am wondering what purpose would be served by putting into a proposed consent decree a provision that no additional acreage should be put under irrigation in Colorado in the Arkansas River valley. Would it be proposed that all water above the amount needed for that acreage should be allotted to Kansas or be considered as surplus to be divided in some manner between Colorado and Kansas? While Colorado might refrain from constructing additional ditches for new projects yet there are many ways in which their people could increase their use of water, and even the actual number of acres irrigated, without Kansas being able to show that that was done unless an examination of the acreage actually irrigated was made each year. Many of the farmers in the Arkansas River basin do not have sufficient water to irrigate all of the farm each year and, consequently, one field is watered one year and another the next. If water could be obtained, the user could materially increase the acreage actually irrigated without the state engineer's and census reports showing any increase

in irrigated acreage. In addition to that many water users can, and in recent years have, materially increase their use of water without increasing ditch diversions by the construction of pumping plants which pump water from wells on individual farms or even pump into some o. the ditches and thus they use more water on the land than head-gate deliveries show. Pumping depletes the ground water reservior and intercepts return flow which would become stream flow if not intercepted. Where extensive pumping lowers the reservoir below stream bed, stream flow sinks into the bed to recharge it, thus pumping imposes an additional but unmeasured burden on the water supply.

• • • • •

Reply Appendix Item 2

Excerpt from Pl. Ex. 514

Supreme Court of Colorado,
Case No. 27738, *Kuiper v. AT&SF Railway*,
Amendments to the Rules and Regulations on the Arkansas River, Transcript of Testimony March 1975, District Ct., Water Div. No. 2, Cases Nos. W-4079 et al., 1011 pp.

• • • • •

[Vol. I, pp 213-14]

[Direct Testimony of Dr. Danielson]
[S]o that if you will look at page 22 [Pl. Reply App., Item 9] of exhibit I [the 1975 Colorado State Engineer Report, Jt. Ex. 94 in No. 105, Orig.] you will find there listed by year, first the year and then the total electric power consumed and these records were taken both from the U.S.G.S. and from Colorado State University which more or less collects and correlates these power records, and, then, the estimate of total water pumped in terms of thousands of acre feet, and the footnote explains what I just went through, ...

• • • • •

Q. In 1972 on page 22 it appears that the total water pumped exceeds 200,000 acre feet.
A. Yes, that is correct.

• • • • •

A-13

Reply Appendix Item 3

Colo. Ex. 57

Letter dated April 10, 1951, from Hans Kramer, Chairman and Representative of the United States, Arkansas River Compact Administration, to Col. Charles H. McNutt, District Engineer, U.S. Army Corps of Engineers.

COPY

220 Bush Street
San Francisco 4, California
ARKANSAS RIVER COMPACT ADMINISTRATION
Lamar, Colorado

April 10, 1951

Colonel Charles H. McNutt, C.E.
District Engineer
Corps of Engineers, U.S. Army
P.O. Box 1538
Albuquerque, New Mexico

My Dear Colonel:

This will acknowledge receipt of letter from your office dated 5 April 1951, File SWKGC, regarding the availability of the final operation studies of John Martin Reservoir which were made for the consummation of the Colorado-Kansas-Arkansas River Compact. Your communication is the result of previous correspondence with Judge Stone, he having furnished me a copy of his letter to you dated March 29, 1951.

I appreciate fully the policy of your office to coordinate basic criteria used in studies for new project planning with those used in the formulation of existing compacts. However, in the case of the Arkansas River Compact no final operation studies of John Martin Reservoir were actually made, nor did any of the engineering compilations that were made during the negotiation of the Compact enter into the ultimate wording. Hence, strictly speaking, "the final operation studies" referred to in your letter are non-existent.

Perhaps it would help toward understanding the preceding statement, if I were to trace just what was done in the way of

engineering studies during the negotiation of the Arkansas River Compact. The Commission's Committee on Engineering Data and Studies (of which I was chairman) undertook initially (1) to assemble pertinent engineering data upon which the engineers would be in full agreement and (2) to make engineering analyses upon which the Commission could rely in formulating a compact. This assignment, on which work was started in 1946, was predicated on the initial assumption that some fixed criteria for operating John Martin Reservoir would have to be agreed upon as a basis for the Compact, it being the initial objective of the Engineering Committee to analyze and evaluate the results obtained from various hypotheses. In organizing the work of the Engineering Committee, it was contemplated that its final report would consist of three main parts, viz. I—Engineering Data; II—Analysis of Historic Flow; III—Operation Studies.

In the execution of that program the Committee submitted its First Interim Report on June 26, 1947. This report, dealing only with Part I, consisted principally of a series of tables of pertinent stream flow and diversion data compiled from various sources (e.g., U.S.G.S., State Engineers) for

convenient reference. It also included engineering data on John Martin Reservoir from which some evapo-transpiration and siltation estimates were computed.

A Second Interim Report, also on Part I, was submitted on November 24, 1947. This report merely rounded out the First Interim Report with respect to stream flow, diversion and storage records by including the period 1943-1946 during which the then partially completed John Martin Reservoir had operated. It also presented some calculated data on accretions for the periods 1908-1942 and 1943-1946.

ies that were mentioned in Judge Stone's letter. These studies had no bearing or subsequent formulation of the Compact.

Neither of the two Interim Reports was ever released for public use nor were they included in the Official Record of the Commission, it having been the prevailing thought that publication would be in the form of a final report which would include operation studies, if and when such a final report were made.

However, even before the date of the Second Interim Report, the trend of the negotiations took a decided turn away from the concept of fixed operating conditions based on firm interstate allocations toward the more flexible philosophy, best described as "live and let live," which became the basis of the ultimate-Compact. That principle, which was an outgrowth of the Interim Executive Agreement between Colorado and Kansas governing the operation of John Martin Reservoir during the period of compact negotiations, permitted either State to obtain water from John Martin Reservoir (when stored water was available) without regard to the other State and without the need for keeping books to balance hypothetical debits and credits. Further background details of this evolution are obtainable from careful study of the Official Record of the Colorado-Kansas-Arkansas River Compact Commission, particularly the 7th, 8th, 9th and 10th meetings. A copy of this Record was furnished to your office on February 14, 1950.

With agreement upon a flexible and indeterminate basis of interstate apportionment, it was obvious that operation studies of John Martin Reservoir could serve no useful purpose in spelling out the terms of the compact, if indeed such studies were practicable under the circumstances. Accordingly, operating studies were dispensed with then and there and that phase of the work of the Engineering Committee was suspended after the rendition of its Second Interim Report. No "Final Report" was ever made. Thus, as stated earlier in this letter, no final operation studies were authored by the Compact Commission. By the same token, such studies and/or analyses as were undertaken in the earlier stages of compact negotiation (when fixed allocations were pre-

supposed) are manifestly worthless for current consideration in relation to the terms of the Compact that was actually consummated.

Colonel Charles H. McNutt - 3 - April 10, 1951

Let me assure you that the above explanation, lengthy and detailed though it is, is not intended in any way to deny your office access to any available material that may be helpful to you. My explanation is intended merely to support the warning in Judge Stone's letter that unoriented and injudicious use of such material might be not only a waste of effort but could lead to erroneous or confused results. On the other hand, it may well be that some of the tabulations of existing data which were compiled in the Interim Reports could be useful in your current studies if brought up to date by your office.

It occurs to me that the most satisfactory way to arrive at a clear and complete mutual understanding of this matter is for the principal parties to get their feet under and their heads together over the same table. To that end I would suggest a get-together, preferably in Judge Stone's office in Denver where the Interim Reports and other material are on file. In addition to representatives of your office and myself such a conference should include Mr. R. M. Gildersleeve, who worked closely with the Commission's Engineering Committee and Mr. D.C. Bondurant, formerly of your office and now in the Missouri River Division, who actively assisted me on the Committee and who is not only well acquainted with the evolution of the Compact, but had intimate knowledge, in his former capacity, of its impact on studies for new projects in the Arkansas Basin. From my viewpoint such a huddle is the best procedure toward obtaining the desired coordination of studies.

I expect to be in Denver in connection with other business on Monday, April 30, 1951, and would be glad to reserve my time from 10:00 a.m. to 2:00 p.m. for a conference as suggested above.

If you deem such a meeting advisable please have your office issue invitations to those concerned.

Sincerely yours,

Hans Kramer
Chairman and Representative of
the United States
Arkansas River Compact Administration

cc: Judge Clifford H. Stone
Mr. Robert V. Smrha

Reply Appendix Item 4

Excerpt from Def. Ex. 623

Patterson, C.L. Program for the Improvement of Irrigated Agriculture in the Arkansas Valley in Colorado (Feb. 1932)

[29-30]

• • • • •

Ground Waters.

As has been explained, surface water and ground water are so intimately and directly related, that it is wrong to consider them separately. But because it is customary, that plan has been pursued.

Many of the recent irrigation developments have involved the use of ground waters, some projects being of the drainage type, and many of them involving pumping plants. In the Arkansas Valley there are dozens and perhaps hundreds of irrigation pumping plants, few of which have observed the existing regulations regarding the filing of maps and statements of claim or have rights established by adjudication, or which operate with any administrative recognition. New projects are being promoted and constructed, and as water values increase, the confusion will be multiplied still further. The uncertainty as to the future status of stream flow rights is increasing. The negative public policy is promoting conflict and litigation. Other unfortunate features are the fact that investments have been and are being made some of which may be destroyed, and that no proper legal status is being established under which these possibilities of reclamation may attain the value and permanence they may deserve.

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Reply Appendix Item 5

Excerpt from Jt. Ex. 5

Interim Report of Committee on Engineering Data and Studies to Colorado-Kansas Arkansas River Compact Commission (June 26, 1947)

[3]

• • • • •

To evaluate the resulting effects of operations of John Martin Reservoir, determinations and definitions of the water supply and diversion conditions and relations that historically prevailed along the Arkansas River in Colorado Water Districts 14, 17 and 67, and in Kansas between the Stateline and Garden City, are necessary. Unnecessary data not included in the attached tabulations are streamflow at stations on the Arkansas River upstream from Canon City in Colorado, and downstream from Garden City, in Kansas, and at stations on all tributary streams other than the Purgatoire River near its mouth. Also not included are the diversions by ditches from the Arkansas River in Colorado Water Districts 11 and 12, upstream from the western boundary of Pueblo County, and by ditches from all tributaries of the Arkansas River. Irrigation supplies derived from pumps in both States are not included in the tabulated diversions.

• • • • •

Reply Appendix Item 6

Excerpt from Jt. Ex. 19

Minutes of meetings of the Arkansas River Compact Administration from 1949 through December, 1984

MINUTES OF
ARKANSAS RIVER COMPACT ADMINISTRATION
ANNUAL MEETING
December 14, 1954
LAMAR, COLORADO

Attendance -
For Colorado:

Ivan C. Crawford, Denver; Director Colorado Water Conservation Board
Harry B. Mendenhall, Rocky Ford; Chairman of Colorado Representatives
Harry C. Nevius, Lamar; Administration Secretary and Treasurer

For Kansas:

Wm. E. Leavitt, Garden City.
R. V. Smrha, Topeka.
Roland H. Tate, Garden City, Vice Chairman & Chairman of Kansas Representatives

For the United States:

Brig. Gen. Hans Kramer, San Francisco, Calif.; Chairman of the Administration

• • • • •

[13-14]

General Kramer said that the basic motivating principle in formulation of the Compact was, "Live and Let Live". In December 1948 the final discussion on Article IV-D was held. At that time Commissioner Mendenhall suggested a review and asked for a

change in wording. The word "material" was inserted after that discussion and the decision to insert the word was to eliminate too rigid interpretation.

General Kramer quoted pertinent passages from the Record (pp 17- 32,33).

General Kramer said, after listening to all the discussion and studying the matter from the viewpoint of the intent of those who wrote the Compact, that he considers the amount of depletion to be not material. However, if, for the sake of discussion, it should be presumed that the 530 Acre Feet average depletion is material, then too, the amount of 65 Acre Feet average sediment reduction must likewise be considered material. This would mean to the United States that the life of the Reservoir, from this point of view, will be 50 years longer or an equivalent of 1 to 2 percent. The whole question resolves itself to, "Is the amount material?" The suggestion that the Golden Rule and the principle of "Live and Let Live" be adhered to was stressed by General Kramer as his closing remark.

General Kramer then resumed the Chair.

Judge Tate said he would like to make a statement on behalf of the Kansas position. He and his co-workers on the Administration as the Kansas delegation concur fully with Governor Arn and they have no desire to deviate from his views as expressed in his letter of August 8, 1954 to the Chief of Engineers. With reference to the averages spoken of, they may be relatively unimportant, however, there are times when they may become material. Kansas thinks that there may be ways to relieve the depletion by operation in District 67 and other upstream users. He believes that the depletion should be absorbed entirely by Colorado's portion of the river—not District 67 and Kansas alone.

• • • • •

Mr. Smrha moved: The Administration does not approve, at this time, the Project as proposed by the Corps of Engineers on the Purgatoire River.

Mr. Nevius seconded the motion remarking that his main concern was the plan of operation and the effect that it might have on the area below the Project.

Mr. Crawford stated that he was emphatically opposed to the motion. He felt that its passage would be, in effect, closing the door on future development of the Arkansas basin above John Martin Reservoir. He said he believed that action today might save life and property in upstream communities.

Chairman Kramer stated that it was not incumbent upon the Administration to make comments either way, and that the matter could be tabled, if desired.

Mr. Tate reviewed the action taken by the Administration in past meetings. He agreed with General Kramer that the U. S. Representative should make a report to the Government and that the Corps of Engineers should be advised of the Administration's views.

A brief discussion on a parlimentary matter ensued followed by a short recess.

• • • • •

Upon reconvening, Chairman Kramer asked if further discussion was desired on Mr. Smrha's motion.

On vote, Colorado voted Aye with Mr. Crawford dissenting. Kansas voted Aye, and the motion was declared passed.

Chairman Kramer again reminded the Administration of the next scheduled regular meeting of March 22, 1955.

The meeting adjourned at 2:45 P. M.

• • • • •

The above minutes were approved by action of the Administration March 22, 1955.

Hans Kramer (Brig. Gen. U.S.A.-Ret.)
Administration Chairman

Harry C. Nevius,
Administration Secretary

Reply Appendix Item 7

Excerpt from Jt. Ex. 32

McDonald, J. William, Memorandum to
Arkansas River
Compact Administration re ARCA Investigation
(October 4, 1985)

[15]

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c. Previous Well Studies.

Third, the Kansas' engineering consultants stated that previous investigations of well pumping in Colorado demonstrated that well diversions had depleted surface streamflows. The problem with the previous studies cited by the Kansas engineering consultants is that the theoretical depletions from well depletions are not reflected in actual streamflow records. For example, the single and double-mass diagrams involving the flows of the Arkansas River at Las Animas and usable stateline flows prepared for this investigation do not show a gradual change in slope that would reflect depletions caused by well pumping. Instead, the curves of the Arkansas River at Las Animas have fairly constant slopes. The curves involving usable stateline flows show a sharp break downward beginning in 1974 and continuing through 1979 and then a break upward beginning in 1980. This corresponds to the decline in tributary inflow, rather than to well development in Colorado.

• • • • •

[22-23]

D. Pre- and Post-Compact Flows of the Arkansas River at Las Animas.

Mr. Pope also concluded that the flow of the Arkansas River at Las Animas had declined during the period 1949-1973 as compared to the precompact period. (Pope Report, p. 22, §5). However, I believe that Mr. Pope and I are in agreement that this decline is explained by the change in water rights administration

in Colorado when there is water in the conservation pool in John Martin Reservoir. (p. 10).

II. Matters for Further Investigation

As noted above, both reports are in general agreement that the changes in relationship shown by the double-mass curves occurring since 1974 have been below the Las Animas gage on the Arkansas River. This isolates the reach appropriate for further investigation.

In my opinion, plains precipitation during the period 1974-1982 is a matter that warrants further investigation. In addition, tributary inflow from plains drainage areas may have declined during the period 1974-1979 as the result of soil conservation measures. Such conservation measures were found to have had a substantial effect on streamflow in the Republican River Basin. If, after an investigation of the factors which appear most likely to have caused the decline in usable stateline flows during the period 1974-1982, including: 1) reduced diversions by ditches in Colorado Water District 67; 2) the operating plan for John Martin Reservoir; 3) decreased plains precipitation; and 4) soil conservation measures, it does not appear that this decline can be entirely attributed to such factors, then a further investigation of possible causes may be justified. However, at this time, I cannot agree to undertake an investigation into well development in Colorado when the single and double-mass diagrams do not suggest that well development in Colorado has had an impact on usable stateline flows.

Reply Appendix Item 8

Excerpt from Jt. Ex. 88

Simons, Li and Associates, Inc., 1984.
Preliminary Assessment, Development and Administration of Water Resources in the Arkansas River Valley

[iv-v]

• • • • •

V. Conclusions and Recommendations

Major conclusions from this investigation are:

1. The Arkansas River Compact entitles Kansas to the pre-compact usable stateline flows and a 40 percent share of the conservation benefits resulting from the construction and operation of John Martin Reservoir.

2. Usable stateline flows *increased* slightly after the compact until about 1973. Since 1974, however, usable flows have *declined* to about 45 percent of pre-compact values. This has resulted in *material depletion* of Kansas ditch diversions.

3. Post-compact well development in Colorado has caused approximately 150,000 acre-feet per year of depletions to the Arkansas River. It is likely that depletion associated with Colorado well development is a major cause of *decline* in usable stateline flows.

4. Operation of the Trinidad Project since 1979 has caused 26,000 to 35,000 acre-feet of depletions in excess of those which would have resulted from the operation approved by the Compact Administration.

5. Kansas' entitlement to usable quantities of water under the Arkansas River Compact has been *materially depleted* by post-compact development in Colorado. A conservatively low estimate of this depletion for the period of 1974 to 1981 is 40,000 to 50,000 acre-feet per year.

The major recommendations for further study are:

1. The findings of this preliminary assessment should be verified, including additional comparisons of pre- and post-compact use in Colorado.

2. The operation of the Trinidad Project should be analyzed in more detail.

3. Colorado well development and its effect on Kansas should be further documented and analyzed.

4. The operation of the Pueblo Reservoir winter water storage program should be reviewed and studied to determine if the program has or is causing an adverse impact to the State of Kansas.

5. The operation of John Martin Reservoir should be evaluated to determine the long term effect of the 1980 Storage Resolution.

6. Potential mechanisms to mitigate material depletion to the compact entitlement of the State of Kansas should be developed.

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[1.1]

I. INTRODUCTION

1.1 *Scope and Nature of Study*

Simons, Li & Associates, Inc. (SLA) was authorized to conduct a water resources investigation of the Arkansas River basin by the State of Kansas, Office of the Attorney General in September 1983. This report describes the preliminary study of flow conditions of the Arkansas River basin since the signing of the Ar-

kansas River Compact by the States of Colorado and Kansas in late 1948. The purpose of this study was to compile and evaluate information necessary to determine if the State of Kansas has sustained material injury under the terms and conditions of the compact.

The scope of work for this study is summarized below as excerpted from the contract for professional services between SLA (Second Party) and the State of Kansas (First Party) dated September 26, 1983:

1. Second Party hereby agrees to perform a study and provide a written report via First Party to the Kansas Legislature. Such report shall contain the opinion of a qualified expert as to whether there is probable cause to believe that since the year 1949 the development of the Arkansas River basin in Colorado by federal and/or state agencies, by private enterprise, or by combinations thereof, which may involve construction of dams, reservoirs, or other works for the purpose of water irrigation and control, as well as the improvement and prolonged functioning of work already existing, has materially depleted in usable quantity or availability water for the water users in Colorado and Kansas. In addition, Second Party hereby agrees to include in said report an evaluation of the current and past operating procedures utilized at the Trinidad Dam and Reservoir project in Trinidad, Colorado. In addition, Second Party hereby agrees to include in the above-mentioned report a statement concerning whether any said depletion has resulted in material injury to the State of Kansas.

2. Second Party hereby agrees to provide a summary of the factual basis for any opinion expressed by any expert in the above-mentioned report.

• • • • •

Reply Appendix Item 9

Excerpt from Jt. Ex. 94

Stream Depletion by Wells in the Arkansas River Basin — Colorado, 1975, Office of the State Engineer

Year	Total Electric Power Consumed (M.KWH.)	Total Water Pumped (1000 AF)	Year	Total Electric Power Consumed (M. KWH.)	Total Water Pumped (1000 AF)
1940	1.243	2.5	1957	5.788	84
1941	0.6	5	1958	7.024	79
1942	0.358	6.5	1959	11.223	153.5
1943	0.831	7	1960	11.486	146
1944	0.459	9	1961	9.627	121
1945	0.590	9.5	1962	11.070	132
1946	1.749	15	1963	20.781	177.9
1947	1.207	15	1964	23.252	192.9
1948	1.234	15	1965	12.990	120.1
1949	2.193	23.5	1966	16.733	138.8
1950	3.492	31	1967	16.734	140.3
1951	3.483	31	1968	18.287	161.1
1952	4.518	46	1969	13.962	119
1953	6.090	58	1970	15.576	132
1954	9.336	94	1971	22.008	183.7
1955	9.382	97.5	1972	25.080	208.3
1956	11.925	152			

TABLE 7. Ground Water Withdrawal by Irrigation Wells—Arkansas River (Canon City to State Line)

Source:

1940-1962 From USGS basic data release no. 21

1963-1968 From USGS basic data release no. 21 plus estimates for San Isabel elec. co. using regression equation $Y = 8.0322E + 6.897$, Y = GW withdrawal (1000 AF) E = elec. power consumed (M.KW)

1969-1973 Estimated using regression equation. This eqn. is based on USGS data (Basic data release 21) and power data (CSU)

. . . . .

[53]

CONCLUSIONS

The increasing use of ground water for irrigation in the Arkansas River basin since 1950 has affected stream flows in such a way as to deprive senior water users of a portion of their lawful water supply. This study has conclusively shown by means of a water budget analysis and mass diagrams that excessive pumping from the Arkansas River alluvium has resulted in the following:

1) Decrease in stream flows below Canon City;
2) Decrease in the quantity of water diverted from the main stem of the Arkansas River;
3) Reduction in return flows as indicated by a decrease in the river gain between Canon City and the State line.

The "Net River Gain" section of this report indicates that the decrease in diversions and return flows is equivalent to the consumptive use of well water, which from 1965 through 1972 average 112,800 Ac-Ft per year. This amount is obviously significant and of such a magnitude that the restoration of the value of the senior water right to its pre-well development level is warranted. This does not necessarily spell doom for the well users in that water management schemes can be devised that will prevent injury to senior surface water users while at the same time allowing continued ground water withdrawals.

. . . . .

Reply Appendix Item 10

Excerpt from Jt. Ex. 139

**Barker, R.A., L.E. Dunlap, and C.G. Sauer, 1983.
Analysis and Computer Simulation of
Stream Aquifer Hydrology,
Arkansas River Valley, Southwestern Kansas.
U.S. Geological Survey, Water-Supply Paper 2200.**

• • • • •

[55]

Results of model experimentation with hypothetical 1970-79 conditions show that water levels and streamflow within the study area were more directly affected by the reductions in incoming streamflow (compared to 1951-69 average conditions) than by either the smaller than average amounts of annual precipitation or the increased pumpage during the 1970's. Simulation indicates that: (1) The effects of less recharge during periods of smaller than average amounts of precipitation were offset by more recharge during brief periods when precipitation was much greater than the mean monthly amount and (2) the effects of the increased pumpage were partly offset by increased recharge resulting from increased irrigation.

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Reply Appendix Item 11

Excerpt from Transcript vol. 10

(Cross-examination of Douglas Littlefield)

• • • • •

Q. DO YOU KNOW IF MR. PATTERSON PREPARED A REPORT THAT DEALT WITH GROUND WATER IN THE ARKANSAS RIVER VALLEY IN THE EARLY 1930S?

A. I'M UNFAMILIAR WITH THE REPORT.

Q. I WOULD LIKE TO HAND YOU WHAT HAS BEEN MARKED AS DEFENDANT'S EXHIBIT 623 AND ASK YOU IF YOU CAN IDENTIFY IT.

A. THIS IS A REPORT BY C.L. PATTERSON, CONSULTING ENGINEER, ENTITLED "PROGRAM FOR THE IMPROVEMENT OF IRRIGATED AGRICULTURE IN THE ARKANSAS VALLEY IN COLORADO." IT IS DATED FEBRUARY, 1932. AND APPARENTLY YOU OBTAINED A COPY OF THIS FROM MY FILES DURING MY DEPOSITION, BECAUSE THE FRONT PAGE HAS A COPY OF MY FILE FOLDER HEADINGS.

Q. DO YOU RECALL REVIEWING THIS REPORT?

A. I DON'T RECALL REVIEWING IT. I'M CERTAIN THAT I LOOKED THROUGH IT AT SOME POINT.

Q. IS THIS ONE OF THE DOCUMENTS YOU HAD COPIED AT THE COLORADO STATE HISTORICAL SOCIETY?

A. YES. THIS APPARENTLY IS FROM THE ARKANSAS VALLEY DITCH ASSOCIATION PAPERS.

• • • • •

[46-47]

• • • • •

Q. DOESN'T IT APPEAR FROM THIS REPORT THAT THERE WAS A GREAT DEAL OF CONFUSION ABOUT THE NATURE OF RIGHTS TO GROUND WATER AMONG COLORADO WATERS USERS AT THIS TIME?
A. THAT CERTAINLY WOULD BE A FAIR CONCLUSION, YES.
Q. DO YOU HAVE ANY REASON TO BELIEVE THAT THIS CONFUSION WAS ANY LESS IN THE 1940S?
A. I DON'T — HAVE NO WAY OF KNOWING.

• • • • •

Reply Appendix Item 12

Excerpt from R. vol. 63

April 16, 1991
(Direct Examination of Robert Longenbaugh)

[189-90]

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Q. ARE YOU FAMILIAR WITH THE PRACTICES OF FARMERS IN THE ARKANSAS VALLEY RELATED TO OPERATION OF IRRIGATION PUMPING PLANTS?
A. YES, I AM.
Q. WHAT IS THE BASIS OF YOUR KNOWLEDGE?
A. MY BASIS IS SERVING AS EXTENSION IRRIGATION SPECIALIST THROUGHOUT THE '70S, AND ALSO THE FACT THAT I MEASURED OBSERVATION WELL NETWORK THROUGHOUT THE VALLEY IN THE '60S. AND IN ADDITION, THE STUDIES THAT WERE DONE WITH COLORADO STATE UNIVERSITY AND THE U.S.G.S. IN THE PERIOD 1962 THROUGH '64 AND '65.
Q. I ASKED YOU ABOUT THIS PREVIOUSLY, BUT WHAT IS YOUR OPINION CONCERNING THE AVERAGE EFFICIENCY OF PUMPING PLANTS IN THE ARKANSAS VALLEY?
A. I WOULD SAY THAT I WOULD EXPECT A VALLEY WIDE AVERAGE TO BE 40 TO 45 PERCENT.
Q. HAVE THEY CHANGED —
A. THAT WOULD BE 1985 CONDITIONS.
Q. HAVE THEY CHANGED OVER TIME?
A. YES, THEY HAVE.
Q. WHAT CHANGES HAVE OCCURRED?
A. THEY HAVE DECREASED IN EFFICIENCY OVER TIME BECAUSE OF THE WEAR OF THE PUMP AND THAT THEY DON'T CHANGE OUT THE PUMPS. SO THE AGE OF THE PUMPS IN MY OPINION IS OLDER EVERY YEAR, AVERAGE AGE OF THE PUMPS IN THE VALLEY.

• • • • •

Reply Appendix Item 13

Excerpt from R. vol. 65

April 18, 1991
(Cross-examination of Robert Longenbaugh)

[69-70]

• • • • •

Q. BUT AT SOME POINT IT WILL HAVE TO BE CHANGED; IS THAT RIGHT?

A. I DON'T KNOW. WE HAVE GOT PUMPS DOWN THERE NOW, MR. DRAPER, THAT ARE — WHEN THEY ARE SERVICED, I SAW AND OBSERVED PUMPS IN MY FIELD TRIP IN JUNE WHEN THE DISCHARGE PIPE HERE JUST SPEWING WATER EVERYWHERE, COMPLETELY RUSTED OUT. HOW A FARMER CAN NOT BE DOING WHAT HE SHOULD BE DOING AND WASTING THAT MUCH WATER, I DON'T UNDERSTAND.

WHEN YOU PULL PUMPS AND COLUMN PIPE OUT, IT IS NOT UNCOMMON TO FIND COLUMN PIPE HAVING HOLES IN THE SIDES. THE WATER SQUIRTS OUT THROUGH THE BOTTOM OF THE PUMP, GOES DOWN THE WELL CASING. I HAVE MADE PUMP EFFICIENCY TESTS OF 5 PERCENT, 5 PERCENT EFFICIENCY, 10 PERCENT EFFICIENCY. AND, YES, I CAN HOPE WE GET THE FARMERS INTERESTED IN CHANGING IT OUT. I CAN'T GUARANTEE YOU THAT, EITHER.

• • • • •

Reply Appendix Item 14

Excerpts from Transcript vol. 77

(Direct Examination of Jeris Danielson)

[30-31]

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Q. IS YOUR ANALYSIS HERE, WITH RESPECT TO THE EFFECTS OF PUMPING, WAS THAT BASED ON THE ACTUAL PUMPING AMOUNTS OR ON THE DECREED AMOUNTS FOR WELLS?

A. I BELIEVE THE CALCULATION WAS BASED ON THE PUMPING AMOUNTS SHOWN IN TABLE 7 AT PAGE 22 [of Jt. Ex. 94, Reply App., Item 9.]

Q. IN OTHER WORDS, THE ACTUAL PUMPING AMOUNTS?

A. WELL, I CAN'T SAY "ACTUAL." I AM NOT SURE WE KNOW THE ACTUAL. I THINK THE VALUES THERE — IF YOU LOOK AT THE FOOTNOTE IN THE TABLE — INDICATES SOURCES AND TECHNIQUES OF ESTIMATES. SO I WOULD NOT REPRESENT TO YOU THAT THESE ARE THE ACTUAL PUMPING. THESE WERE THE BEST THAT MY STAFF COULD DETERMINE IN 1972.

Q. OF ACTUAL PUMPING?

A. OF ESTIMATED PUMPING, YES.

Q. THESE ARE NOT THE DECREED AMOUNTS FOR THE WELLS IN THE VALLEY; IS THAT RIGHT?

A. I DON'T BELIEVE SO, NO.

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Reply Appendix Item 15

Excerpt from R. vol. 78

May 16, 1991
(Cross-examination of Jeris Danielson)

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[85]

Q. OKAY. ON PAGE 53 [of Jt. Ex. 94, Reply App. Item 9], MR. DRAPER ASKED YOU SEVERAL QUESTIONS ABOUT THE THREE CONCLUSIONS SET FORTH ON PAGE 53. DO YOU STILL AGREE WITH THOSE CONCLUSIONS?

A. YES.

Q. LOOKING AT THE SENTENCE WHICH FOLLOWS THE THREE CONCLUSIONS, "THE REPORT INDICATES THAT THE DECREASE IN DIVERSIONS AND RETURN FLOWS IS EQUIVALENT TO THE CONSUMPTIVE USE OF WELL WATER, WHICH FROM 1965 THROUGH 1972 WAS SAID TO AVERAGE 112,800 ACRE FEET PLUS PHREATOPHYTE LOSSES."

DOES THE DECREASE IN DIVERSIONS AND RETURN FLOWS TRANSLATE INTO A REDUCTION IN STATE LINE FLOWS IN YOUR OPINION?

A. NO, NOT IN THE EVALUATION THAT WE DID IN THIS REPORT.

Q. WHY NOT?

A. BECAUSE THE EVALUATION WAS COMPLETED IN '72, WE WERE LOOKING AT LOSS OF RETURN FLOW — OR THE DIMINISHMENT IN NET RIVER GAIN, IT'S A LUMP TERM — IN THE REACH AND NOT EXAMINED AT THE STATE LINE. AGAIN, INSOFAR AS THERE MAY HAVE BEEN WELLS IN 1972 PRODUCING BELOW THE BUFFALO HEADGATE, IT IS CONCEIVABLE THAT THOSE WELLS COULD HAVE AT TIMES CAUSED A DECREASE IN STATE LINE FLOW. WE DID NOT MAKE THAT DETERMINATION.

• • • • •

Reply Appendix Item 16

Excerpt from R. vol. 84

May 24, 1991
(Direct Examination of Duane Helton)

• • • • •

MR. DRAPER: LET ME JUST MAKE ONE POINT IN THAT REGARD, YOUR HONOR. I THINK THE REFERENCE THAT MR. ROBBINS MAKES TO THE ESTABLISHED RIGHTS UNDER THE COLORADO COURTS THAT WERE ENTERED MANY, MANY YEARS AFTER THESE RIGHTS MAY HAVE BEEN FIRST USED. WHEN THEY WERE ENTERED WITH A CERTAIN PRIORITY DATE, THEY WERE NOT GRANTED THE RIGHT TO PUMP OUT OF PRIORITY, WHICH IS WHAT THEY'VE BEEN DOING. IF THEY HAD, LET'S SAY, A 1947 PRIORITY DATE, THOSE WELLS HAVE NOT BEEN KEPT IN THAT NITCH IN THE PRIORITY SYSTEM. THEY HAVE BEEN LIKE A FIRST PRIORITY ON THE SYSTEMS THAT CAN TAKE OUT EVEN THE ROCKY FORD DITCH BECAUSE THEY PUMP UNREGULATED. AND I THINK IN THIS DISCUSSION OF LEGAL POINTS, IT'S APPROPRIATE FOR THE COURT TO KEEP THAT IN MIND.

SPECIAL MASTER: ALL RIGHT.

MR. ROBBINS: YOU'VE HEARD DR. DANIELSON'S TESTIMONY AND YOU'LL CERTAINLY HEAR MORE LEGAL ARGUMENT FROM ME ON THAT POINT, BUT AT THE BOTTOM LINE, THE COMPACT ALLOCATED THE RESOURCE BETWEEN TWO STATES ON A CERTAIN DATE AND COLORADO CITIZENS WHO HAPPENED TO BE TAKING FROM THE GROUND WATER SYSTEM AT THAT TIME, WHO HAPPENED TO HAVE BEEN PUMPING AT THAT TIME AND WHO WEREN'T AT THAT TIME ABLE EVEN TO GET A DECREE FOR THEIR GROUND WATER RESOURCES, THE FACT THAT THEIR OPPORTUNITY DIDN'T ARISE UNTIL

LATER SHOULDN'T BE TO THEIR DETRIMENT OR TO THEIR PREJUDICE.

AND THE QUESTION OF HOW COLORADO'S DITCHES AFFECT ONE ANOTHER, THE PRE-1900 DITCHES AND THE POST COMPACT 1900 WELLS, IS PROBABLY — IS AN ISSUE THAT COLORADO HAS BEEN WRESTLING WITH FOR 30 YEARS AND IS NOT AN ISSUE THAT ACCRUES TO KANSAS'S BENEFIT.

THEY ARE VERY MUCH LIKE, AT THE BANQUET, THE ANIMALS THAT GET AROUND THE TABLE, AND THEY WANT THE SCRAPS THAT FALL OFF, AND I DON'T THINK THAT THAT'S THE PURPOSE OF THIS PROCEDURE. I THINK THAT COLORADO WATER USERS WHO HAVE PRE-COMPACT WATER RIGHTS ARE ENTITLED TO THEIR PROTECTION.

SPECIAL MASTER: LET'S GIVE MR. DRAPER ONE COMMENT AND THEN LET'S NOT HAVE ANYMORE ARGUMENT AT THIS POINT.

IT IS CLEAR THAT INVOLVED IN THE PUMPING ANALYSIS, THAT THE WHAT IF PUMPING ANALYSIS IS A CERTAIN APPROACH WITH RESPECT TO THE PRE-COMPACT WELLS, AND THAT'S ONE OF THE THINGS THAT I WILL ULTIMATELY HAVE TO APPLY THE LAW TO AND TO ANALYZE AND TO REACH A DETERMINATION ON, AND SO I THINK THIS POINT, I DON'T REALLY NEED TO HAVE A LOT OF ARGUMENT ON IT. I SIMPLY NEED TO UNDERSTAND WHAT HAS BEEN DONE AND I THINK I DO THAT.

BUT YOU GET ONE LAST COMMENT, MR. DRAPER.

MR. DRAPER: THANK YOU, YOUR HONOR, I'LL KEEP IT SHORT.

WHEN WE PASS OVER TO WHAT AMOUNT OF PUMPING OUGHT TO BE GRANDFATHERED UNDER THE COMPACT, OUR POSITION IS THAT IT'S WHAT PUMPING WAS AFFECTING THE RIVER AT THE TIME

OF THE COMPACT. AND COLORADO, UNDER THE GUISE OF THESE DECREES, MOST OF WHICH WERE ENTERED WITHOUT OPPOSITION MANY YEARS LATER, THEIR POSITION IS THEY CAN INCREASE BEYOND THAT, INCREASE THE EFFECTS ON THE RIVER, AND I DON'T THINK THAT WAS THE INTENTION OF THE FRAMEWORK OF THE COMPACT.

SPECIAL MASTER: I THINK I UNDERSTAND KANSAS'S ARGUMENTS AND COLORADO'S.

MR. ROBBINS: BEFORE THINGS GET TOO FAR DOWN THE ROAD, THOUGH, I WANT MAKE IT CLEAR THAT THE INSINUATION THAT SOMEHOW SOMETHING IMPROPER WAS DONE IN A COURT OF LAW IN COLORADO ISN'T APPROPRIATE, YOUR HONOR, BECAUSE THE SUGGESTION IS THERE HAS BEEN A FRAUD PERPETRATED UPON THE COMPACT.

• • • • •

Reply Appendix Item 17

Excerpts from Transcript vol. 125

(Direct Examination of Dale Book)

[59-61]

• • • • •

SPECIAL MASTER: YOU DID NOT ESTIMATE PUMPING FIGURES FOR THE 1940 TO '49 PERIOD, DID YOU?

THE WITNESS: 1940 THROUGH 1947, I DID NOT, 1948 AND 1949, I DID.

SPECIAL MASTER: ALL RIGHT. ONE OF THE CRITICISMS THAT COLORADO EXPERTS MADE IN USING THE 11,000 FIGURE FOR 1948 WAS THAT THAT WAS A WET YEAR, AND THEREFORE, YOU WOULD BE LOOKING AT SURFACE DIVERSIONS WHEN PUMPING WAS DOWN.

DO YOU AGREE WITH THAT?

THE WITNESS: COLORADO'S ESTIMATES OF PUMPING SHOWN IN 165* INDICATE, BASED ON THEIR ESTIMATES, THAT THEY BELIEVE THAT THERE WAS PUMPING HIGHER THAN THE 1948 LEVEL FOR YEARS PRIOR TO [1948]. THE U.S.G.S. IN JOINT EXHIBIT 66, THEIR ESTIMATES WERE THAT 1948 WAS THE HIGHEST LEVEL OF PUMPING THAT HAD BEEN ACHIEVED UP UNTIL THAT TIME.

• • • • •

SPECIAL MASTER: SO, MR. BOOK, YOU ARE SAYING THEN THAT THE U.S.G.S. CALCULATED 1948 AS THE HIGHEST AMOUNT OF PUMPING THAT HAD OCCURRED UP UNTIL THAT TIME, DURING THE '40'S.

THE WITNESS: THEY HAD AN ESTIMATE OF 15,000 ACRE FEET FOR 1946, '47, AND 1948.

SPECIAL MASTER: 15,000?

THE WITNESS: YES, FOR EACH OF THOSE YEARS.

BY MR. DRAPER:

• • • • •

SPECIAL MASTER: THAT IS FROM 1946 THROUGH '48?

THE WITNESS: THOSE ARE THE THREE YEARS THAT THEY HAVE THAT. THEIR TABULATION GOES BACK TO 1940.

SPECIAL MASTER: AND FROM YOUR CALCULATIONS, USING POWER RECORDS, YOU CONCLUDED THAT THAT WAS HIGH, THE 15,000?

THE WITNESS: FOR 1948?

SPECIAL MASTER: YES.

THE WITNESS: YES. THE REASON FOR THAT, WE ARE CONSISTENTLY BELOW THE U.S.G.S. VALUES FOR THE PERIOD 1948 THROUGH 1963. THEY USED A DIFFERENT METHOD OF CALCULATING OR REPORTING PUMPING IN BASIC DATA RELEASE 21 FOR THOSE YEARS. IT WAS NOT BASED ON THE FIELD INVESTIGATIONS OF THE WELLS. WE DON'T KNOW EXACTLY HOW IT WAS DETERMINED, BUT IT WAS BASED ON POWER RECORDS, GROSS POWER RECORDS FROM POWER COMPANIES.

AND IT APPEARS TO ME THAT THEY MAY HAVE SIMPLY-TAKEN POWER DATA, TOTAL POWER DATA FROM THE COMPANIES AND APPLIED THE POWER COEFFICIENTS THAT THEY HAD DETERMINED IN THE FIELD IN THE 1960'S AND APPLIED IT TO ALL OF THE POWER WITHOUT ANY REDUCTION FOR THE AREA. BECAUSE WE MAKE THE REDUCTION FOR THE STUDY AREA, WE END UP WITH SLIGHTLY LOWER NUMBERS THAN THE U.S.G.S. FOR THE ENTIRE PERIOD OF 1948 THROUGH 1963.

I MIGHT POINT OUT THAT COLORADO, I GUESS WOULD TEND TO AGREE WITH THAT INTERPRETA-

TION BACK UNTIL ABOUT 1953. FROM 1953 THROUGH 1963, THE TWO STATES ARE VERY CLOSE IN THEIR ESTIMATES AND BOTH ARE BELOW THE U.S.G.S. TABULATION.

SPECIAL MASTER: ALL RIGHT.

• • • • •

Reply Appendix Item 18

Excerpt from R. vol. 129

September 25, 1992
(Cross-examination of Thomas Major)

[34]

• • • • •

Q. NOW, YOU HAVE SAID THAT YOU AND THOSE IN YOUR OFFICE OF THE G.S. TOOK FIERCE PRIDE IN THE ACCURACY OF THE REPORTS THAT YOU ISSUED; IS THAT A FAIR STATEMENT?
A. YES, SIR.
Q. AND THESE REPORTS WERE CARFFULLY CHECKED AND PEER REVIEWED BEFORE THEY ARE RELEASED TO THE PUBLIC?
A. YES, SIR.
Q. WHAT LENGTH OF TIME ELAPSED FROM THE END OF THE STUDY PERIOD TO THE PUBLICATION OF THIS REPORT DURING WHICH YOU AND OTHERS CARRIED OUT THAT CHECKING?
A. APPROXIMATELY TWO YEARS.
Q. ARE YOU AWARE THAT THE STATE OF COLORADO IN THIS CASE IS ATTEMPTING TO DISCREDIT CERTAIN INFORMATION IN THIS REPORT?
A. NO, SIR.

• • • • •

[61-62]

Q. NOW, I WOULD LIKE TO CONFIRM MY STATEMENT THAT I THINK YOU HAVE MADE, AND THAT IS THAT YOU HAVE NO REASON TO DOUBT THE ACCURACY OF THE PUMPING FIGURES THAT ARE SHOWN IN BDR 21?
A. I DIDN'T DEVELOP THEM, AND I HAVE NO REASON TO BELIEVE THAT ANYONE WOULD DO ANYTHING THAT WOULDN'T BE ACCURATE.

Q. AND THOSE FIGURES WERE SUBJECT TO THE NORMAL PEER REVIEW AND CAREFUL CHECKING OF THE UNITED STATES GEOLOGICAL SURVEY?
A. YES, SIR.
Q. AND THAT WOULD INCLUDE IN PARTICULAR THE GROUND WATER WITHDRAWAL SHOWN IN FIGURE 3 OF THE REPORT?
A. WOULD YOU PLEASE REPHRASE IT, BECAUSE THERE ARE PORTIONS OF THIS THAT I CAN'T VERIFY AT ALL?
Q. THE QUESTION WAS WHETHER YOU HAD ANY REASON TO DOUBT, GIVEN THE PEER REVIEW AND CAREFUL CHECKING THAT YOU HAVE DESCRIBED, ANY REASON TO DOUBT THE ACCURACY OF THE GROUND WATER WITHDRAWAL FIGURES, THE PUMPING FIGURES SHOWN IN FIGURE 3.
A. KNOWING THE INTEGRITY OF TED HURR, I DON'T DOUBT IT AT ALL.
Q. WOULD YOU BE SURPRISED IF SOMEONE CLAIMED THAT THE FIGURES FOR 1940 WAS ACTUALLY 15 TIMES HIGHER THAN WHAT MR. HURR DETERMINED?
A. WITH THE BEST INFORMATION AVAILABLE, I'M SURE THAT'S WHAT HE THOUGHT WAS CORRECT.

• • • • •

Reply Appendix Item 19

Excerpt from R. vol. 131

October 27, 1992
(Cross-examination of Harold Simpson)

[22]

• • • • •

Q. WELL, THIS IS A DECREE OF THE WATER COURT, IS IT NOT?
A. YES; IT IS. BUT IT IS BASED ON INFORMATION PROVIDED BY THE APPLICANT.
Q. WELL, YOU ARE NOT SUGGESTING THAT PEOPLE FILED FALSE INFORMATION WITH THE WATER COURT, ARE YOU?
A. YES, I AM.
Q. WOULD THAT BE WHAT MR. ROBBINS HAS CALLED A FRAUD ON THE WATER COURT?
A. I DON'T KNOW WHAT HE CALLED IT. BUT I DO KNOW THAT IT HAPPENED. AND IT HAPPENED ESPECIALLY IN THIS TIME FRAME WHEN THERE WERE SO MANY APPLICATIONS FILED WITH THE COURT.
Q. NOW, YOUR OFFICE RELIES ON THE WATER RIGHTS DECREES, DOESN'T IT?
A. YES.

• • • • •

Reply Appendix Item 20

Excerpt from

Colorado's Closing Brief Re Kansas' Well Claim

• • • • •

D. KANSAS IS NOT ENTITLED TO RELIEF FOR WELL DEVELOPMENT WHICH TOOK PLACE PRIOR TO 1965

[44]

Colorado raised various affirmative defenses in its answer to the complaint; however, in cases between States, the Supreme Court has not paid attention to labels, *Washington v. Oregon*, 297 U.S. at 528, but has focused on the equities of the case. *Colorado v. Kansas*, 320 U.S. at 394. As Justice Cardozo said in *Washington v. Oregon*, it is "high equity that moves the conscience of the court in giving judgment between states." 297 U.S. at 523. Therefore, in addressing the reasons that Kansas' complaint about post-compact well development in Colorado which took place in the 1950s and early 1960s should be denied; Colorado will not try to pigeonhole Kansas' actions as laches, estoppel, etc. but will focus on those factors which courts of equity have traditionally considered in deciding whether to give judgment.

• • • • •

[48]

Given the fact Kansas failed to complain about post-compact well development in Colorado for many years, at least twenty years in the case of wells drilled in 1965, thirty five years in the case of wells drilled in 1950, Kansas should be barred from complaining about the effects of well development which occurred in Colorado prior to 1965. *Washington v. Oregon*, 297 U.S. at 528-29.

• • • • •

Reply Appendix Item 21

Excerpt from

Colorado's Memorandum Re Matters to Be Raised at Oral Argument

[2]

• • • • •

A. *LACHES*

Although the Special Master agrees that Kansas made no complaint about well pumping in Colorado until 1984 at the earliest, the Special Master may have felt constrained to reject the defense of laches because otherwise Kansas' delay would have barred relief against almost all of the wells in existence in 1985. Colorado suggests an alternate way to view Kansas' well claim and a method to apply laches which would produce a fairer result.

• • • • •

[4-5]

The Special Master may have felt constrained to reach this conclusion because otherwise Kansas' delay would have barred relief against 1,842 out of 2,062 large capacity irrigation wells drilled before 1965. Draft Report at 165. There is, however, another way to view Kansas' claim. . . . Rather than view Kansas' claim as one based on well construction *per se*, the claim can be viewed as one based on well *pumping* and treated in the nature of a continuing nuisance, in which each year's well pumping gives rise to a new cause of action. . . . Viewed in this light, Kansas' delay might bar relief against post-compact well pumping through the mid-1970s which occurred without complaint by Kansas, but not the increased well pumping which occurred in later years. . . . Viewing Kansas' claim in this light would also allow the Special Master to acknowledge the substantial prejudice that Kansas' delay has worked on Colorado in trying to quantify depletions to usable Stateline flows which allegedly occurred up through the mid-1970s.

• • • • •

[52]

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VI. CONCLUSION

Colorado believes that the draft report should be modified as follows:

1. Laches should bar Kansas' well claim for pumping which occurred up to at least 1975, ten years before Kansas complained about post-compact well pumping in Colorado.

• • • • •

Supreme Court, U.S.
FILED
JAN 3 1985
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No. 105, Original

In the Supreme Court of the United States

OCTOBER TERM, 1994

STATE OF KANSAS, PLAINTIFF

v.

STATE OF COLORADO

ON EXCEPTIONS TO THE REPORT OF THE SPECIAL MASTER

BRIEF FOR THE UNITED STATES IN RESPONSE TO THE EXCEPTIONS OF KANSAS AND COLORADO

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QUESTION PRESENTED

The United States will address the following issues:

1. Whether Kansas may prove a violation of the Arkansas River Compact by demonstrating that Colorado violated the operating principles for Trinidad Reservoir (Kansas Exception No. 1).

2. Whether Kansas adequately proved that Colorado's administration of the Winter Water Storage Program resulted in a material depletion of usable flows at the Colorado-Kansas Stateline (Kansas Exception No. 2).

3. Whether the Special Master selected an appropriate method for calculating "usable" depletions (Kansas Exception No. 3).

4. Whether a heightened standard of proof and equitable principles, such as the doctrine of laches, are applicable in a Compact enforcement action (Colorado Exception Nos. 1 and 4).

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In the Supreme Court of the United States

OCTOBER TERM, 1994

No. 105, Original

STATE OF KANSAS, PLAINTIFF

v.

STATE OF COLORADO

ON EXCEPTIONS TO THE REPORT OF THE SPECIAL MASTER

BRIEF FOR THE UNITED STATES IN RESPONSE TO THE EXCEPTIONS OF KANSAS AND COLORADO

STATEMENT

In 1985, the State of Kansas brought this original action against the State of Colorado to resolve disputes under the Arkansas River Compact, Act of May 31, 1949, ch. 155, 63 Stat. 145. This Court granted Kansas leave to file its complaint, *Kansas* v. *Colorado*, 475 U.S. 1079 (1986), and the Court appointed the Honorable Wade H. McCree, Jr., to serve as the Special Master. 478 U.S. 1018 (1986). Upon Judge McCree's death, the Court appointed Arthur L. Littleworth as the Special Master. 484 U.S. 910 (1987). Special Master Littleworth supervised pretrial proceedings, granting the United States' unopposed motion to intervene, and allowing certain amendments to the pleadings. He entered preliminary

rulings, held a liability trial on Kansas's claims, and prepared a report. On October 3, 1994, this Court received the Special Master's report on the liability phase of the case and invited the parties to file exceptions. 115 S. Ct. 48 (1994).[1]

1. The Arkansas River Basin

The Arkansas River originates on the eastern slope of the Rocky Mountains in central Colorado and flows south and then east across Colorado and into Kansas. It receives significant in-flows from the Purgatoire River, its major tributary in Colorado, which originates in the Sangre de Cristo mountains in southern Colorado near the New Mexico border. The Purgatoire River flows in a northeasterly direction to join the Arkansas River about 60 miles west of the Kansas border at Las Animas, Colorado. See 1 Rep. 35-40, 50-57. See Pocket Map (contained in 1 Rep.).

The United States has constructed three relevant water storage projects on this river system. The John Martin Reservoir, located immediately east of the juncture of the Purgatoire and Arkansas Rivers in Colorado, is operated by the Army Corps of Engineers to control floods and to provide storage water in accordance with the Arkansas River Compact. It has a storage capacity of approximately 618,000 acre-feet. 1 Rep. 45-48. The Pueblo Reservoir, located on the Arkansas River about 150 miles upstream of the Kansas border near Pueblo, Colorado, is managed by the Department of the Interior's Bureau of Reclamation as part of the Fryingpan-Arkansas Project. It has a storage capacity of approximately 358,000 acre-feet. 1 Rep. 43-44. The

[1] The Special Master's report consists of three volumes (cited as _ Rep. ___) and a bound appendix (cited as Rep. App. __).

Trinidad Reservoir, located on the Purgatoire River near Trinidad, Colorado, is jointly managed by the Army Corps of Engineers and the Bureau of Reclamation to control floods and to provide storage water for use by the Bureau of Reclamation's Trinidad Project. It has a storage capacity of approximately 114,000 acre-feet. 1 Rep. 43.

Twenty-three canal systems in Colorado divert water from the Arkansas River for irrigation. Fourteen of those systems are located upstream from John Martin Reservoir, and four of those systems have associated privately owned, off-channel, water storage facilities. Those facilities include Lake Henry and Lake Meredith, the Holbrook, Dye, Adobe Creek and Horse Creek Reservoirs, and the Great Plains Reservoir System. They were constructed before Colorado entered into the Arkansas River Compact and collectively have a storage capacity of about 800,000 acre-feet. Six canal systems in Kansas operate between the Colorado border and Garden City. A small associated reservoir, Lake McKinney, has a storage capacity of about 3600 acre-feet. See 1 Rep. 41-43.

2. The Arkansas River Compact

The Arkansas River Compact apportions the Arkansas River between the States of Kansas and Colorado. As the Special Master explains, the Compact was an outgrowth of two original actions that the States had filed in this Court disputing their respective entitlements to use of the Arkansas River. 1 Rep. 1-6. In each of those cases, the Court denied Kansas's request for an equitable apportionment. See *Colorado* v. *Kansas*, 320 U.S. 383, 391-392 (1943); *Kansas* v. *Colorado*, 206 U.S. 46, 114-117 (1907).

In the first suit, Kansas sought to enjoin water diversions in Colorado, but the Court denied relief on the ground that Colorado's depletions of the Arkansas River were insufficient at that time to warrant injunctive relief. *Kansas* v. *Colorado*, 206 U.S. at 114-117. In the second suit, Colorado sought to enjoin lower court litigation brought by Kansas water users against Colorado water users, while Kansas sought an equitable apportionment of the Arkansas River. The Court concluded that Colorado was entitled to the injunction it sought, but the Court concluded once again that Kansas had failed to show sufficient injury to warrant an equitable apportionment of the Arkansas River. *Colorado* v. *Kansas*, 320 U.S. at 391-392. See 1 Rep. 2-6.

In denying Kansas's second request for judicial relief, the Court suggested that a dispute such as this one calls for "expert administration rather than judicial imposition of a hard and fast rule," and that the controversy "may appropriately be composed by negotiation and agreement, pursuant to the compact clause of the federal Constitution." *Colorado* v. *Kansas*, 320 U.S. at 392. Shortly thereafter, the States appointed commissioners to negotiate an interstate agreement. In 1949, the States approved, and Congress ratified, the Arkansas River Compact, 63 Stat. 145. See generally 1 Rep. 5-6, 71-90, 91-108; Rep. App. 1-17 (reprinting text of Compact).

The Compact was intended to "[s]ettle existing disputes and remove causes of future controversy" between the States and their citizens over the use of the Arkansas River, and to

> [e]quitably divide and apportion between the States of Colorado and Kansas the waters of the Arkansas River and their utilization as well as the benefits arising from the construction, operation and maintenance by the United States of John Martin Reservoir Project for water conservation purposes.

Compact Art. I (Rep. App. 1-2). The Compact accomplishes those goals through two basic mechanisms.

First, the Compact protects the States' respective rights to continued use of the Arkansas River through a limitation on new depletions. Article IV-D of the Compact allows new development in the form of dams, reservoirs, and other water-utilization works in Colorado and Kansas, provided that the "waters of the Arkansas River" are not thereby "materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact." Rep. App. 5. The Compact defines the term "waters of the Arkansas River," Art. III-B (Rep. App. 2-3), but it does not expressly define what constitutes a "material" depletion or a "usable" quantity.[2]

Second, the Compact regulates the storage of water at John Martin Reservoir and specifies the criteria by which each State is entitled to call for water releases. Article V of the Compact, which provides the "basis of

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[2] The full text of Article IV-D states as follows:

> D. This Compact is not intended to impede or prevent future beneficial development of the Arkansas River basin in Colorado and Kansas by Federal or State agencies, by private enterprise, or by combinations thereof, which may involve construction of dams, reservoir, and other works for the purposes of water utilization and control, as well as the improved or prolonged functioning of existing works: Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under the Compact by such future development or construction. Rep. App. 5.

apportionment of the waters of the Arkansas River," prescribes the timing of storage at the reservoir and the release criteria. See Rep. App. 5-9. Basically, between November 1 and March 31, in-flows to the John Martin Reservoir are stored, subject to Colorado's right to demand a limited amount of water. Between April 1 and October 31, the storage of water is largely curtailed, and either State may call for releases at any time in accordance with the flow rates set out in the Compact.[3]

The Compact creates an interstate agency, the Arkansas River Compact Administration, to administer the Compact. Compact Art. VIII (Rep. App. 11-15). The Compact Administration consists of a non-voting

[3] During the April-to-October irrigation season, Colorado may generally demand releases of water equivalent to a flow of 500 cubic feet per second (cfs) and Kansas may request releases equivalent to a flow of between 500 cfs and 750 cfs. See Rep. App. 5-9; 1 Rep. 45-48. The Compact regulates only the release rates, and historically, each State attempted to maximize its volumetric share by requesting release at the maximum flow rate until all of the storage water was depleted, which typically occurred early in the irrigation season. See 1 Rep. 45-48. In 1980, the Compact's administrative body, the Arkansas River Compact Administration (see text *infra*), adopted a resolution, known as the 1980 Operating Plan (reprinted at Rep. App. 107-117) to provide for more efficient utilization of the storage water. See 1 Rep. 47-48; 2 Rep. 171-180. In essence, the Operating Plan established separate storage accounts for each State and allocated 40 percent of stored water to Kansas and 60 percent to various Colorado canals. In addition, the Plan allowed three Colorado canal companies to store water in John Martin Reservoir that they otherwise would store elsewhere. In exchange for that right, those Colorado canals allowed 35 percent of their stored water to be credited to a Kansas Transit Loss Account. By its terms, the 1980 Operating Plan can be terminated by either State. See 1 Rep. 47-48; Rep. App. 111, 114-117.

presiding officer designated by the President of the United States and three voting representatives from each State. It is empowered to adopt by-laws, rules, and regulations, prescribe procedures for the administration of the Compact, and perform functions to implement the Compact. See Arts. VIII-B and VIII-C (Rep. App. 11-12). Article VIII-H of the Compact directs that the Administration shall "promptly investigate[]" violations of the Compact and report its findings and recommendations to the appropriate state official. Rep. App. 15. That Article further states that it is "the intent of this Compact that enforcement of its terms shall be accomplished in general through the State agencies and officials charged with the administration of water rights." Rep. App. 15.

3. The Current Proceedings

Kansas brought this action in 1985 to enforce the provisions of the Arkansas River Compact. In the course of pretrial proceedings, the Special Master narrowed the dispute to three alleged violations of the Compact arising from: (a) groundwater pumping in Colorado; (b) the Winter Water Storage Program (WWSP) at Pueblo Reservoir; and (c) the operation of Trinidad Reservoir. 1 Rep. 58. See also 1 Rep. 15-34 (describing procedural history of the case).[4]

a. Kansas's First Amended Complaint alleged that Colorado had violated the Arkansas River Compact by failing to allow the Compact Administration to investigate the impact of groundwater pumping on

[4] In response to Kansas's complaint, Colorado filed counterclaims challenging well pumping in Kansas and storage of releases from John Martin Reservoir into Lake McKinney. The Special Master has recommended dismissal of Colorado's counterclaims, and Colorado has not excepted to that recommendation. See 1 Rep. 58; 3 Rep. 436-459; Colo. Excepts. 1-2.

Arkansas River flow at the Colorado-Kansas Stateline. First Amended Compl. para. 12 (Rep. App. 23-24). At trial, Kansas altered its theory and produced evidence that post-Compact increases in groundwater pumping in Colorado had caused a substantial decline in the Arkansas River's surface flow. The Special Master evaluated that evidence and concluded that post-Compact groundwater pumping in Colorado had "materially depleted" the "usable" flow at the Stateline, in violation of Compact Article IV-D (Rep. App. 5). See 2 Rep. 263. He rejected Colorado's defenses that Kansas's claim should be barred under the equitable doctrines of laches, estoppel, waiver, and unclean hands. See 1 Rep. 169-170. The Special Master recommended that, if the Court agreed with his liability determination, the Court should remand the case to him for a determination of the appropriate remedy. 2 Rep. 263.

b. The WWSP was conceived by the Bureau of Reclamation and Colorado to obtain additional benefits from the Bureau's Fryingpan-Arkansas Project. That Project, which Congress authorized in 1962, Pub. L. No. 87-590, 76 Stat. 389, consists of a system of reservoirs and other facilities that transport water from the Colorado River Basin, west of the Continental Divide, to the more populated areas in the Arkansas River Basin, east of the Continental Divide. The Project's facilities, which were substantially completed in 1975, include a storage reservoir and water collection system on the west side of the Continental Divide, a tunnel for transporting water across the Divide, and three water storage facilities on the east side of the Continental Divide. Pueblo Reservoir is the largest of the eastern water storage facilities. The "imported" water stored there provides irrigation flows for lands served by the

Fryingpan-Arkansas Project, including lands within the Southeastern Colorado Conservancy District. That water is also utilized for power generation and for municipal and industrial uses. See 1 Rep. 43-44; 2 Rep. 306-307.

In 1964, the Bureau of Reclamation and Colorado began planning a program to utilize excess capacity at Pueblo Reservoir to store a portion of the winter-time flow of the Arkansas River. Prior to Pueblo Reservoir's construction, that winter-time flow was used by Colorado irrigators either to inundate uncultivated cropland (a process known as "winter irrigation") or for storage in privately owned, off-channel reservoirs. Under the WWSP, which commenced in 1976, most of the winter flow that was previously used for "winter irrigation" is stored in Pueblo and John Martin Reservoirs, as well as private reservoirs, for distribution to irrigators during the irrigation season. 2 Rep. 307-311.

Kansas initially challenged the WWSP as a "unilateral rejection of the Arkansas River Compact Administration's Resolution of July 24, 1951, requiring that any reregulation of the native water of the Arkansas River be approved by the Compact Administration." First Amended Compl. para. 12 (Rep. App. 24). See 2 Rep. 306. The Special Master partially resolved that claim against Kansas by recommending that the Court grant Colorado's motion for summary judgment that the Compact does not require Administration approval of the WWSP. See 2 Rep. 306. The Special Master reserved for trial "the issue of whether Stateline flows had actually been materially depleted by the WWSP in violation of the compact." 2 Rep. 306. Based on the evidence adduced at trial, the Special Master concluded that "Kansas has not proved that the WWSP has caused material Stateline

depletions." 2 Rep. 335. The Special Master determined that "the depletions shown by the Kansas model are well within the model's range of error" and that "[o]ne cannot be sure whether impact or error is being shown." 2 Rep. 334-335. The Special Master observed that "Kansas' case has not been helped by its own contradictions in quantifying impacts to usable flow." 2 Rep. 335.

c. Trinidad Reservoir was constructed by the Army Corps of Engineers in 1977, but it is jointly managed by the Corps for flood control and by the Bureau of Reclamation for irrigation and for conservation storage of winter flow. 1 Rep. 43; 3 Rep. 382-390. Before Trinidad Reservoir was constructed, the Bureau of Reclamation had prepared operating principles that, among other things, restricted conservation storage in the Reservoir to a maximum of 20,000 acre-feet. See 3 Rep. 388-390. The operating principles were approved by the Corps of Engineers and the Colorado Water Conservation Board, and were included in the February 1967 repayment contract between the Bureau and the local Purgatoire Water Conservancy District. 3 Rep. 390-391, 414. The Bureau also submitted the operating principles to the State of Kansas, which approved them, subject to certain amendments, and to the Compact Administration, which adopted a motion approving them in their amended form. 3 Rep. 390-395.

From 1979 to 1984, Colorado's Division 2 Water Engineer allowed the Purgatoire River Water Conservancy District, which had effective control over the Trinidad Reservoir's conservation pool, to make certain "accounting transfers" that, Kansas alleged, violated the operating principles. 3 Rep. 396. In 1988, at the request of the Compact Administration, the Bureau of Reclamation conducted a study of operations at Trinidad

Reservoir and concluded that two storage accounting practices at the Reservoir constituted a "departure from the intent of the operating principles." 3 Rep. 397.[5] Thereafter, in 1989, the Colorado Engineer directed that those practices be curtailed. 3 Rep. 405. The Special Master concluded that "[i]t appears that this directive is currently being followed, although a state action has been filed to amend relevant water rights decrees." 3 Rep. 406.

As the Special Master explained, Kansas's current theory respecting the Trinidad Project "is not apparent from the face of the complaint." 3 Rep. 407. Kansas asserted in its 1989 Amended Complaint (Rep. App. 23-24) that Colorado had violated the Compact by rejecting Kansas's requests for a Compact investigation into Colorado's accounting practices. 3 Rep. 407. At other times in the litigation, however, Kansas seemed to suggest that the Trinidad Project had caused a material depletion in Stateline flows, in violation of Article IV-D of the Arkansas River Compact (Rep. App. 5). See 3 Rep. 407-408. By the time of trial, Kansas "presented quite a different legal concept." 3 Rep. 408. Kansas argued that a "departure from the Operating Principles is a violation of the Compact, regardless of injury." 3 Rep. 408.

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[5] The Bureau found that the Colorado accounting practices at issue were "contrary to the assumptions" of the operating principles because they allowed the Trinidad Reservoir to store irrigation water in excess of 20,000 acre-feet. The Bureau specifically identified the Colorado Engineer's practices of: (1) allowing storage of winter flows without counting them against the 20,000 acre-feet storage limit; and (2) allowing water remaining in the conservation account at year's end to be transferred to another account so that a full 20,000 acre-feet could be stored in the following year. 3 Rep. 396-397, 399-406.

Kansas sought to prove a violation of the Compact under that theory by relying on evidence "comparing the flows into John Martin Reservoir 'as they would have occurred under the Operating Principles with the flows that occurred under actual operations.'" 3 Rep. 409.[6]

The Special Master received that evidence, but concluded that Kansas's Trinidad Reservoir claim should be dismissed. He explained that Article IV-D of the Compact (Rep. App. 5) allows construction of new reservoirs in Colorado "provided the flows of the Arkansas River are not materially depleted in usable quantity or availability for use in Kansas." 3 Rep. 424. The Special Master therefore determined that Article IV-D furnishes the Compact mechanism for challenging Trinidad Reservoir operations. He stated that while the Trinidad Reservoir operating principles were intended to prevent a "material depletion," a failure to adhere to the principles does not in itself "establish a Compact violation." 3 Rep. 426. Instead, a Compact claim must be based on "the actual operation of the Project" and "whether such operation has caused a material depletion." 3 Rep. 426. The Special Master concluded that Kansas had failed to show that the Trinidad Project had caused "a material depletion within the meaning of Article IV-D." 3 Rep. 431.

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[6] Kansas's theory may have reflected the State's own doubts whether it could prove that the Trinidad Reservoir operations "materially depleted" Stateline flows in violation of Article IV-D. The Bureau's study (see note, 5, *supra*) suggested that even when the Trinidad Reservoir was operated in violation of the operating principles, it produced greater in-flow to John Martin Reservoir than if the Trinidad Project had not been in place. 3 Rep. 399-401; see also 3 Rep. 426-428.

In reaching that conclusion, the Special Master rejected Kansas's argument that the Compact Administration's adoption of a motion approving the operating principles was a "proper exercise of authority under Article VIII-B of the Compact" that was "binding upon Colorado." 3 Rep. 412. Article VIII-B empowers the Compact Administration to adopt "rules and regulations," prescribe "procedures for the administration of [the] Compact," and perform other "proper functions." Rep. App. 11. The Special Master examined the record and concluded that the Compact Administration "did not do, nor intend to do, what Kansas now claims." 3 Rep. 414. In particular, he found "nothing to indicate that the Compact representatives of either State thought they were exercising binding authority under Article VIII-B." 3 Rep. 415.

INTRODUCTION AND SUMMARY OF ARGUMENT

The State of Kansas brought this action to enforce its rights under the Arkansas River Compact, which apportions the flow of the Arkansas River between Kansas and Colorado. The Special Master has prepared a thorough report providing his recommendations on Kansas's three central claims and Colorado's two counterclaims. 2 Rep. 336-337. Kansas and Colorado have each filed exceptions to the Special Master's recommendations. Kansas objects to the Special Master's recommendations that this Court: (1) dismiss the Trinidad Reservoir claim; (2) reject, as unproved, the Winter Water Storage Program claim; and (3) reject Kansas's preferred method for determining usable depletions. Kan. Excepts. 1-3. Colorado objects to the Special Master's recommendations that this Court: (1) reject Colorado's laches defenses, which are based on the asserted delay by Kansas in presenting its groundwater

pumping claim; (2) set Colorado's pre-Compact groundwater pumping level at 15,000 acre-feet per year; (3) decline to treat the increases in Stateline flow produced by post-1980 alterations in John Martin Reservoir operations as offsets to the well-pumping depletions; and (4) apply the "preponderance of the evidence" standard to Kansas's proof of Compact violations. Colo. Excepts. 1-4.

With respect to the exceptions filed by Kansas, the United States is in substantial agreement with the Special Master's recommendations. The first exception, which challenges the Special Master's recommendation that this Court dismiss the Trinidad Reservoir claim, is unsound as a matter of law. The Special Master correctly concluded that Kansas had failed to establish that Colorado's accounting practices at Trinidad Reservoir had violated Article IV-D of the Compact, which prohibits new developments on the river system that cause a material depletion of the Stateline flows. He properly rejected Kansas's contention that a violation of the Trinidad Reservoir's operating principles is, in itself, a per se violation of the Compact. Although the Special Master recommends against allowing Kansas to enforce the operating principles through this action, which Kansas brought expressly to enforce the Compact, he has left open the possibility of other remedies if Colorado departs from those principles in the future.

Kansas's second exception, which asks the Court to reject the Special Master's determination that Kansas failed to prove its Winter Water Storage Program claim, is unpersuasive in light of the Special Master's extensive discussion of his reasons for his conclusion. Kansas is wrong in contending that the Special Master erred in placing the risk of uncertainty resulting from lack of data on Kansas. Kansas, as the plaintiff, has the burden

of proving its claims. The Special Master properly found, based upon a thorough examination of the evidence, that Kansas had failed to prove that Colorado's conduct had caused the injury that Kansas alleged. Kansas's contention that the Special Master based his decision on an incomplete record of accretions rests on a misreading of the Special Master's decision.

Kansas's third exception, which asks the Court to reject the Special Master's method for calculating "usable depletions," is without merit. At trial, Kansas presented three different methods for performing that calculation. The Special Master thoroughly reviewed each of those methods and properly concluded that Kansas's "Durbin approach, using Larson's coefficients, is the best of the several methods presented for determining usable flows." 2 Rep. 305. Kansas's objection to the Special Master's reliance on that method overlooks the defects in the "daily flow" method that Kansas favors.

With respect to the exceptions filed by Colorado, the United States did not participate in the proceedings concerning groundwater development in Colorado and does not take a position on the specific merits of Colorado's exceptions. We are in general agreement with Colorado's legal position that the Court's rationale for applying a heightened standard of proof in equitable apportionment actions, *Colorado* v. *New Mexico*, 467 U.S. 310 (1984), would appear to apply in this Compact enforcement action. On the facts of this case, however, the Special Master concluded that Kansas had proved that Colorado's groundwater pumping violated the Compact regardless of the standard of proof applied. We also agree with Colorado that, as a general matter, this Court may recognize laches as an equitable defense in a

Compact enforcement action. It does not necessarily follow, however, that Colorado has established that defense here.

ARGUMENT

A. THE SPECIAL MASTER CORRECTLY CONCLUDED THAT KANSAS FAILED TO ESTABLISH THAT COLORADO'S DEPARTURES FROM THE TRINIDAD RESERVOIR OPERATING PRINCIPLES CONSTITUTE A VIOLATION OF THE ARKANSAS RIVER COMPACT

Kansas challenges the Special Master's recommendation that this Court dismiss the Trinidad Reservoir claim and specifically contests his determination that Kansas failed to prove a violation of the Arkansas River Compact. Kan. Br. 12-26. According to Kansas, the Trinidad Reservoir operating principles were "promulgated as an official action of the Compact Administration in furtherance of its mandate to implement the Arkansas River Compact," and proof that Colorado failed to comply with the operating principles established that Colorado "violated the Arkansas River Compact." Kan. Br. 6-7, 14. See 3 Rep. 408. The Special Master correctly rejected that contention. 3 Rep. 412-433.

As the Special Master recognized, this Court granted Kansas leave to file a complaint based on allegations that Colorado had committed a "breach of the Arkansas River Compact." First Amended Compl. para. 16 (Rep. App. 25). He therefore evaluated Kansas's claims in light of the rights conferred by that interstate agreement. As the Special Master explained, Article IV-D of the Arkansas River Compact specifically states that "[t]his Compact is not intended to impede or prevent future development of the Arkansas River basin" through construction of

new reservoirs, such as Trinidad Reservoir. The only limitation is contained in the proviso to Article IV-D that "the waters of the Arkansas River" may not thereby be "materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact" (Rep. App. 5). See 3 Rep. 424. The Special Master accordingly concluded that to establish a Compact violation, Kansas had to show that the Trinidad Reservoir operations caused a "material depletion" of usable flow at the Stateline compared to what the Stateline flows would have been without the Trinidad Project. 3 Rep. 424-425. That conclusion rests on a straightforward interpretation of the plain language of Article IV-D. See Rep. App. 5.

Kansas nevertheless suggests that the Arkansas River Compact can also be effectively "violated" through conduct that is inconsistent with the Compact Administration's actions. Kan. Br. 6-7, 14. Specifically, Kansas notes that prior to completion of the Trinidad Project, the Compact Administration approved a document containing the Trinidad Reservoir operating principles. Kan. Br. 12-15; Kan. Br. App. A51. See 3 Rep. 412-424. Kansas contends that the Compact Administration's approval of the operating principles "set procedures for operation of Trinidad Reservoir necessary to comply with the Compact" and that a violation of the operating principles should therefore be treated as a violation of the Compact itself. See Kan. Br. 15; 3 Rep. 408.

Kansas can point to nothing in the Compact, however, that provides Kansas with a right to challenge upstream reservoir operations in the absence of a "material" depletion. See 3 Rep. 424-426. Kansas cannot overcome that omission by relying on the Compact Administration's approval of the Trinidad Reservoir operating

principles. The Compact does not empower the Compact Administration to amend the Compact to create a new enforceable right or a new cause of action under the Compact; nor, to our knowledge, has the Compact Administration asserted such a power. See 3 Rep. 416. Indeed, Kansas concedes that point. See Kan. Br. 25 ("An interstate compact adopted under [the Compact Clause] cannot be changed by the interstate agency created by the compact.").

To be sure, the Compact authorizes the Compact Administration to promulgate "rules and regulations consistent with the provisions of this Compact." Compact Art. VIII-B(1) (Rep. App. 11). That Article, however, does not authorize the Compact Administration to accomplish what Kansas attributes to it in approving the operating principles. Article IV-D states that "[t]his Compact"—which includes Article VIII-B, on which Kansas relies—"is not intended to impede or prevent future development" (such as the Trinidad Project) unless the usable Stateline flow is "materially depleted" as a result. Furthermore, Article VIII-B itself allows the Compact Administration to adopt only such rules and regulations as are "consistent with this Compact"; it therefore does not authorize the Administration to adopt rules that impose enforceable standards for establishing a violation of the Compact that differ from the one ("material depletion") set forth in Article IV-D of the Compact itself. But even if the Court construed the Kansas complaint to allege a violation of a Compact rule, and additionally concluded that a State may seek judicial enforcement of such rules, Kansas's claim would still founder. The operating principles at issue here "clearly were not rules of the Compact Administration in any normal sense." 3 Rep. 414. The

Special Master "carefully examined the record presented here of the Compact Administration's consideration of the Trinidad Project," and he found "nothing to indicate that the Compact representatives of either State thought they were exercising binding authority under Article VIII-B." 3 Rep. 415. See 3 Rep. 417-418 & n.8.[7]

Kansas also attempts to overcome that problem through reliance on this Court's decision in *Texas* v. *New Mexico*, 462 U.S. 554 (1983). Kan. Br. 15-19. That case presented a dispute under the Pecos River Compact, Act of June 9, 1949, ch. 184, 63 Stat. 159, which is administered by the Pecos River Commission. New Mexico contended, among other things,

> that this Court may do nothing more than review official actions of the Pecos River Commission, on the deferential model of judicial review of administrative action by a federal agency, and that this case should be dismissed if we find either that there is no Commission action to review or that the actions the Commission has taken were not arbitrary or capricious.

462 U.S. at 566-567. The Court rejected New Mexico's contention, explaining that the Court's original

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[7] Kansas takes issue with the Special Master's conclusion on that point. Kan. Br. 20-22. As the Special Master explained, however, the Compact Administration's approval of the operating principles did not follow the notice and publication requirements established in the Administration's by-laws for adopting rules and regulations. 3 Rep. 413. The fact that the operating principles are expressed in "mandatory" language (Kan. Br. 20, 22) does not transform them into rules formally adopted by the Commission, much less ones that are enforceable in the same manner as the Compact itself. Cf. *United States* v. *Montalvo-Murillo*, 495 U.S. 711, 717-719 (1990).

jurisdiction "extends to a suit by one State to enforce its compact with another State or to declare rights under a compact," *id.* at 567, and that "the mere existence of a compact does not foreclose the possibility that [the Court] will be required to resolve a dispute between the compacting States," *id.* at 568. The Court additionally noted that New Mexico's theory was "untenable" because it "is not the proper function of our original jurisdiction" to conduct "judicial review" of the Pecos River Commission's actions. *Id.* at 570. The Court stated:

> If authorized representatives of the compacting States have reached an agreement within the scope of their congressionally ratified powers, recourse to this Court when one State has second thoughts is hardly "necessary for the State's protection."

Id. at 570-571.

Kansas contends that the *Texas* v. *New Mexico* decision requires this Court to enforce the Trinidad operating principles against Colorado, because the Arkansas River Compact Administration approved those principles and Colorado has no need for "recourse to this Court." Kan. Br. 19. That reasoning is unsound. The issue in *Texas* v. *New Mexico* was whether the Court should engage in judicial review of Compact Commission actions. That issue is not present here. No one has asked this Court to review a Compact Administration decision. The issue instead is whether Kansas may prove a "breach of the Arkansas River Compact" (Rep. App. 25) based on conduct that the Compact itself does

not forbid. The Special Master correctly concluded that Kansas may not do so. 3 Rep. 426.[8]

B. THE SPECIAL MASTER CORRECTLY CONCLUDED THAT KANSAS FAILED TO PROVE THAT THE WINTER WATER STORAGE PROGRAM VIOLATES THE COMPACT

Kansas contends that the Special Master erred in finding that Kansas failed to prove its claim under Article IV-D of the Compact that the WWSP had "materially depleted" Stateline flows. Kan. Br. 26-34. Kansas contends that the Special Master improperly placed the burden of proof on Kansas, erred in his

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[8] The Special Master was careful to indicate that he was rejecting Kansas's Trinidad claim based on the State's theory at trial that Colorado's violation of the reservoir operating principles "*per se* constituted a Compact violation." 3 Rep. 408. He expressly reserved the question that Kansas has not raised in this proceeding—namely, "whether Kansas has a claim for violation of the Operating Principles that is independent of the Compact." 3 Rep. 408 n.6. As the Special Master noted, Colorado has discontinued the practices that precipitated Kansas's claims. 3 Rep. 406 & n.5. If new violations of the operating principles should occur, Kansas would not be foreclosed by the Special Master's recommendation from seeking equitable relief under some other theory in an appropriate forum. Kansas conceivably might even seek to invoke this Court's original jurisdiction to address the issue, *Texas* v. *New Mexico*, 462 U.S. at 567-568, although that course might give rise to questions regarding satisfaction of the usual prerequisites for an original action (*e.g.*, a show of substantial injury) and whether an original action could appropriately be based on criteria other than the Compact's "material depletion" standard. But whatever the answer to those questions, Kansas cannot seek to enforce the operating principles on the theory that it is enforcing the Compact. Cf. *Nebraska* v. *Wyoming*, 113 S. Ct. 1689, 1694-1695 (1993) (distinguishing suits for "enforcement" of a decree from suits seeking recognition of "new rights").

analysis with respect to the "uncertain" nature of the Kansas claims and the effect of accretions on depletions, and failed to give Kansas a full opportunity to prove its case. Kan. Br. 28-34. Those claims are without merit. 2 Rep. 335.[9]

The Special Master properly recognized at the outset of his report that "Kansas, as plaintiff, must prove its case." 1 Rep. 65. Kansas attempted to meet its burden by constructing a hydrologic model of the river system in Colorado and comparing the results of two model simulations, one designed to simulate Stateline flows with no WWSP, the other designed to simulate flows with the WWSP in effect. 2 Rep. 326.[10] See generally 2 Rep. 228-263 (describing the Kansas model). The Special Master reviewed the many errors uncovered in the model simulations, the many changes that Kansas itself made to the quantification of its claim, and the many criticisms of the model's accuracy. 2 Rep. 314-335. Based upon that record, the Master concluded that Kansas had not proved its WWSP claim. 2 Rep. 335.

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[9] Although the Federal Rules of Civil Procedure may be "taken as a guide to procedure in an original action in this Court," Sup. Ct. R. 17.2, and they provide that a Master's factual findings in a non-jury action should be accepted unless clearly erroneous, Fed. R. Civ. P. 53(e)(2), this Court has explicitly departed from that practice and instead conducts an "independent review of the record." *Colorado* v. *New Mexico*, 467 U.S. 310, 317 (1984). The Court has stated that "[t]hough the Master's findings * * * deserve respect and a tacit presumption of correctness, the ultimate responsibility for deciding what are correct findings of fact remains with [the Court]." *Id.* at 317. See also *Mississippi* v. *Arkansas*, 415 U.S. 289, 291-292, 294 (1974).

[10] As the Special Master noted, Kansas modeled "two hypothetical situations without a common base. Kansas did not model the real WWSP, as it has been operating." 2 Rep. 325.

In the face of that failure, Kansas argues that the Special Master should not have placed on it the burden of proof. Kan. Br. 28-32. There is, however, nothing unusual or unfair in placing the burden of proof on Kansas in this case. See 1 Rep. 65-70. Prior to the ratification of the Arkansas River Compact, Kansas clearly had the burden of proving injuries from upstream developments. See *Colorado* v. *Kansas*, 320 U.S. 383, 391-392 (1943); *Kansas* v. *Colorado*, 206 U.S. 46, 114-117 (1907); see also *Colorado* v. *New Mexico*, 459 U.S. 176, 187 n.13 (1982) ("Our cases establish that a State seeking to prevent or enjoin a diversion by another State bears the burden of proving that the diversion will cause it 'real or substantial injury or damage.'"). The Compact adopted a specific standard for establishing injury, and Kansas is now entitled to obtain relief under the Compact upon a showing that usable Stateline flows are "materially depleted." Art. IV-D (Rep. App. 5). The Compact, however, did not address the burden of proof, and it is therefore reasonable to continue to place that burden on Kansas. Cf. *Green* v. *Bock Laundry Mach. Co.*, 490 U.S. 504, 521 (1989) ("A party contending that legislative action changed settled law has the burden of showing that the legislature intended such a change.").[11]

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[11] It may be that the Compact's "material depletion" standard imposes a difficult evidentiary burden on the downstream State. See Kan. Br. 28-30. Nevertheless, Kansas agreed to that standard, and this Court should be reluctant to interfere with the agreement that was struck. Contrary to Kansas's suggestion (Kan. Br. 30), it would be counter-productive to the encouragement of interstate compacts if Kansas could now insist that the practical burdens of proving a violation under the negotiated standard warrant a shifting of the burden of proof. See *Texas* v. *New Mexico*, 462 U.S. at 567-568 ("If there is a compact, * * * our first and last order of business is interpreting the compact.").

Contrary to Kansas's assertions, the Special Master did not reject Kansas's claim simply because is was "uncertain" (Kan. Br. 26, 28, 32); rather, he rejected the claim because it was so "uncertain" as to be unproved. The Special Master conducted a thorough analysis of Kansas's evidence of its WWSP claim and concluded that "Kansas has not proved that the WWSP has caused material Stateline depletions." 2 Rep. 335. Indeed, he found numerous problems with Kansas's evidentiary presentation. For example, he noted that there were significant errors in comparing Kansas's model results with actual Stateline flows.[12] The Special Master was also troubled by the facts that the Kansas model did not take into account "winter storage in John Martin Reservoir," 2 Rep. 326, that it "overpredicts" stored water by 141,500 acre-feet, 2 Rep. 327, and that it did not accurately account for evaporative losses resulting from winter irrigation, 2 Rep. 329-335. The Special Master also observed that "Kansas' case has not been helped by its own contradictions in quantifying impacts to usable flows." 2 Rep. 335. The fact that Kansas provided the

[12] The Special Master pointed out that the State's modeling results for six of the ten years it analyzed either over-predicted or under-predicted observed Stateline flows by more than 30 percent. In the three years in which the error was less than 10 percent, the average error still amounted to 12,251 acre-feet per year. 2 Rep. 322-324. The Special Master contrasted those large errors to the much smaller WWSP depletions calculated by Kansas's model, which amounted to either 4739 acre-feet per year, or 1538 acre-feet per year, depending on the method selected for showing depletions. 2 Rep. 323-324. He found similar problems with Kansas's calculation of depletions on a monthly basis. 2 Rep. 324.

"best estimate" that it could make (Kan. Br. 32) does not excuse its failure of proof.[13]

There is no merit to Kansas's specific contention that the Special Master improperly based his decision to reject its WWSP claim "on the proposition that if accretions were taken into account, then depletions would be essentially eliminated." Kan. Br. 33. The issue of accretions was simply one of the many problems that the Special Master identified in Kansas's proof. He correctly observed that factoring in projected WWSP accretions—by which he meant the increases in flow predicted by the Kansas model (2 Rep. 328)—would "essentially" eliminate Kansas's projected WWSP depletions. See 2 Rep. 327-329, 335. But that considera-

[13] The Special Master rejected Kansas's argument that "[c]ommon sense leads to the conclusion" (Kan. Br. 27) that the WWSP causes Stateline depletions, recognizing that the "issue is much more complex than first appears." 2 Rep. 329. He also recognized that a number of other studies had reached conclusions contrary to those of Kansas. 2 Rep. 313-318. The Special Master discussed studies performed by the United States Geological Survey (USGS) for the period from 1967 to 1979 showing that the WWSP had not reduced in-flow to John Martin Reservoir. 2 Rep. 313. He also discussed a USGS computer model that studied the 1972 to 1974 period and predicted that a winter storage program would increase Stateline flows, 2 Rep. 313, and he cited a study by Kansas's own Division of Water Resources, which concluded there had not been a "reduced flow at the Las Animas gage . . . since operation of Pueblo Reservoir began." 2 Rep. 313. In addition, the Special Master rejected Kansas's contention that Colorado's model proved depletions. 2 Rep. 316, 318. The Special Master noted that Colorado's model indicated total depletions over a 27-year period, at an average of 354 acre-feet per year, but did not translate those depletions to reductions in usable flows. He also noted that Colorado's expert testified that the WWSP had resulted in "no discernible impact" on Stateline flows. 2 Rep. 316.

tion was not a significant basis for his decision. See 2 Rep. 314-335.

Furthermore, Kansas is wrong in suggesting that the Special Master treated the issue of accretions inconsistently in different parts of the case. See Kan. Br. 33-34. Kansas contends that because the Special Master did not take into account accretions in finding Colorado liable on Kansas's groundwater pumping claim, he should not have relied on accretions in rejecting Kansas's WWSP claim. There is, however, no inconsistency in the Special Master's rulings. The Special Master found that Kansas had proved liability with respect to groundwater pumping despite the problems he detected on the issue of accretions.[14] By contrast, the Special Master found that Kansas had failed to establish liability for the WWSP claim because of numerous problems in its proof, including Kansas's failure to account for the fact that the WWSP could actually increase the Stateline flows under certain conditions. 2 Rep. 327-329. The Special Master properly concluded that while further evidence on accretions would be needed to determine the specific remedy for Colorado's groundwater pumping violations, the failure of Kansas's evidence on the WWSP claim was so clear that the claim should be denied.

Kansas's general argument (Kan. Br. 34) that the Special Master failed to allow "full development" of the

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[14] The Special Master specifically stated that he had "no difficulty in concluding that postcompact pumping in Colorado has caused material depletions of the usable Stateline flows." 2 Rep. 263. He nevertheless concluded that the issue of accretions—which in that context referred to increases in Stateline flows resulting from stored water releases and groundwater pumping (2 Rep. 261)—"needs to be examined" to determine the proper remedy. 2 Rep. 263.

facts is entirely without merit. The Special Master gave Kansas every reasonable opportunity to prove its case. He continually allowed Kansas to change its exhibits and analysis during the course of the case, and he also permitted Kansas a recess lasting for a year to correct errors in its evidence and prepare new experts. See, *e.g.*, Rep. App. 82-95. Notwithstanding the Special Master's extraordinary forbearance, Kansas failed to meet its burden. The Special Master's rejection of Kansas's WWSP claim was correct in light of all of the defects he found in Kansas's presentation.

C. THE SPECIAL MASTER SELECTED AN APPROPRIATE METHOD FOR CALCULATING USABLE DEPLETIONS

Kansas also challenges the Special Master's method for calculating what portion of the depletions that Kansas has projected are in fact "usable" depletions. Kan. Br. 35-44. As we have explained, Article IV-D of the Arkansas River Compact prohibits material depletion of water "in usable quantity or availability for use to the water users in Colorado and Kansas." Rep. App. 5. Kansas was therefore obligated to prove that the depletions it alleged—whether based on Colorado's groundwater pumping or the WWSP—deprived Kansas of water at a time when the water could have been utilized by downstream users. See 2 Rep. 291-292. The Special Master considered the methods that Kansas had offered for estimating what portion of total depletions were usable depletions and selected the most appropriate method from among the available options. 2 Rep. 291-305. Kansas's objections to the Special Master's choice are unpersuasive.

Kansas presented three different estimation methods at trial. The first method, which was developed by the

original Kansas expert, Timothy Durbin, used the Kansas hydrologic model to calculate seasonal average flows, and then applied a percentage reduction, using coefficients based on Kansas's seasonal average historic diversions. 2 Rep. 293-294. On that basis, Durbin estimated that approximately "78% of the Stateline flows during the summer were diverted" and approximately "24% of the winter flow was diverted." 2 Rep. 293-294. The second approach, developed by a Kansas "replacement" expert, Stephen Larson, utilized the same basic methodology. Larson, however, made corrections to Durbin's calculations and "modified Durbin's coefficients, using 72% for the summer irrigation months and 25% for the winter months." 2 Rep. 294-296.

The third method, developed by another Kansas "replacement" expert, Brent Spronk, represented a sharp departure from the Durbin and Larson approaches. He did not rely on Kansas's average historic water use. Instead, Spronk attempted to determine the "percentage of days in each month when flows were being fully used in Kansas." 2 Rep. 301. He then utilized the Kansas hydrologic model to calculate "monthly outputs of changed Stateline flow" and applied his daily use estimates to the model's projections of monthly output. 2 Rep. 302. Spronk's approach does not provide seasonal averages, but instead estimates usable depletions on a monthly basis. Spronk's approach predicts an aggregate usable depletion of 489,000 acre-feet from groundwater pumping and the WWSP for the period from 1950 to 1985, while the Durbin analysis using the Larson coefficients predicts a usable depletion of 365,000 acre-feet for that period. 2 Rep. 303.

The Special Master properly concluded that the Durbin approach using the Larson coefficients was the

best of the three methods for calculating depletions to usable flow. He rejected the Spronk approach on the ground that it was incompatible with the Kansas hydrologic model. The Special Master explained that the Kansas hydrologic model was constructed on the basis of average data, 2 Rep. 302, 330 n.130, and it could not reliably predict "changes of Stateline flow on a monthly basis." 2 Rep. 303. Spronk's approach—which relied on the Kansas model to estimate total monthly flows—was therefore inherently unreliable. 2 Rep. 302 n.129, 303-304. The Special Master accordingly rejected the Spronk approach and instead selected a method that would be valid for use with the Kansas model projections. He properly concluded that the Durbin/Larson approach, though imperfect, was the most reasonable of the methods for computing usable depletions on the basis of the Kansas model. See 2 Rep. 305.[15]

Kansas contends that the method adopted by the Special Master is incompatible with the Compact, which, according to Kansas, "excludes the notion of averaging." Kan. Br. 28, 37-39. Kansas also relies on this Court's decision in *Colorado* v. *Kansas*, *supra*, which stated that "average annual flow[s]" are "not helpful in ascertaining the dependable supply of water usable for irrigation." 320 U.S. at 397. Those arguments, however, ignore the fact that Kansas itself has relied on average seasonal and annual flows in constructing its hydrologic model and that its model could not accurately predict "monthly" flows. See 2 Rep. 302-304 & n.130. Thus, if Kansas is correct that the Compact and this Court's decisions

---

[15] The Special Master also considered Colorado's proposed method for calculating "usable" depletions, but he found it flawed in various respects. 2 Rep. 296-300.

prohibit the use of average flows, then the Special Master should have refused to rely on Kansas's model for any purpose and should have rejected Kansas's claims in their entirety.

The Special Master was willing to give credence to Kansas's hydrologic model with respect to Kansas's groundwater pumping claim, despite the model's many problems. See 2 Rep. 228-240. But he also recognized that any approach for determining usable depletions had to be consistent with the limitations of that model. The three approaches that Kansas proposed for calculating usable depletions all required two steps: (1) a calculation of total depletions, and (2) an application of "usability" criteria. 2 Rep. 302 n.129. All three methods also relied on the Kansas model to estimate total depletions. The Spronk approach, however, required the Kansas model to do something that it was not designed to do—namely, to predict accurately the total depletions on a monthly or daily basis. See 2 Rep. 303 & n.130. The Special Master correctly concluded that he could not rely on the Kansas model to obtain that information, and he therefore properly concluded that the Spronk method should not be used. 2 Rep. 303-305.

Kansas's contention that the Special Master rejected Spronk's approach based upon "unsubstantiated criticisms" is without merit. Kan. Br. 41-44. The Special Master made a reasonable choice based on the options that Kansas presented, and his choice is firmly grounded in the evidence produced at trial. The Special Master, who became intimately familiar with Kansas's modeling methodology over the course of the trial, see 2 Rep. 228-263, found that "virtually the entire [Kansas] model is based on average data." 2 Rep. 302. Kansas offers no reason to question that finding. Although the State

disputes the Special Master's conclusion that its hydrologic model is "based on average data," it immediately concedes in an accompanying footnote that "certain components of the Kansas model" are in fact "based on averages." Kan. Br. 41 & n.25.

The Special Master credited the testimony of the Kansas expert who designed the model, Durbin, who stated that, because of the nature of the data input and the assumptions used in its construction, the model's results were reliable only on a long-term average basis. 2 Rep. 303 n.130. The Special Master also credited the testimony of Colorado's and the United States' experts, who provided persuasive documentation that the Kansas model results "were not reliable on a monthly basis." 2 Rep. 303-304. Kansas does not challenge that testimony. Instead, Kansas simply falls back on its argument that "Colorado, not Kansas, should bear the risk of the lack of adequate (non-average) data." Kan. Br. 42.

Notwithstanding Kansas's protestations, the Special Master articulated a sound basis for concluding that Spronk's approach to calculating usable depletions was flawed. The fact that the Spronk approach sometimes coincides with the Durbin/Larson approach (Kan. Br. 44) provides no basis for utilizing it. Indeed, the Special Master's finding of liability demonstrates that Kansas did not need to rely on the Spronk approach to prove that Colorado was liable on the groundwater pumping claim, and that approach does not promise a more accurate answer to the primary issue in developing a remedy—namely, the full measure of Colorado's aggregate depletions over the time period in question. The Court should accordingly accept the Special Master method for calculating usable depletions.

D. THE COURT SHOULD APPLY THE PRINCIPLES ESTABLISHED IN ITS EQUITABLE APPORTIONMENT CASES TO THE STANDARD OF PROOF AND LACHES ISSUES IN THIS CASE

Colorado has also filed a series of exceptions to the recommendations of the Special Master. Those exceptions pertain primarily to the dispute between Kansas and Colorado over Colorado's post-Compact groundwater pumping. The United States did not participate in the proceedings on the groundwater pumping issue, and we accordingly take no position on the specific merits of Colorado's exceptions. Nevertheless, we offer some general observations about the pertinent law. In our view, the legal principles that this Court has developed in the context of equitable apportionment actions provide guidance for the resolution of Colorado's claims involving the appropriate standard of proof and the application of equitable doctrines, such as laches.

This Court recently reiterated its longstanding rule in original actions that a State may obtain a decree against another State to apportion an interstate stream, or to modify a prior apportionment, only upon "proof 'by clear and convincing evidence' of 'some real and substantial injury or damage.'" *Nebraska* v. *Wyoming*, 113 S. Ct. 1689, 1695 (1993). See, *e.g.*, *Idaho ex rel. Evans* v. *Oregon*, 462 U.S. 1017, 1027 (1983); *Colorado* v. *New Mexico*, 459 U.S. 176, 187 n.13 (1982). The Court made clear, however, that if the State seeks only to enforce an existing apportionment, "the plaintiff need not show injury" (beyond a violation of the decree itself) because the decree establishes the plaintiff's right to relief. *Nebraska* v. *Wyoming*, 113 S. Ct. at 1695. See *Wyoming* v. *Colorado*, 309 U.S. 572, 581 (1940). The Court did not explicitly answer the question, however, of what

standard of proof would apply to factual disputes in a State's action to enforce a prior decree. The Court had no need to resolve that matter because the enforcement issue decided in that case, which was before the Court on motions for summary judgment, did not involve an issue of disputed material fact. See *Nebraska* v. *Wyoming*, 113 S. Ct. at 1695-1697.

This Court has left no doubt that the "clear-and-convincing" evidentiary standard applies when a State seeks to establish an equitable apportionment or to modify it in a way that would disturb the status quo, either by enjoining an existing use or by allowing a proposed diversion. See *Nebraska* v. *Wyoming*, 113 S. Ct. at 1695; *Colorado* v. *New Mexico*, 467 U.S. 310, 315-317 (1984); *Colorado* v. *New Mexico*, 459 U.S. 467 U.S. at 187 n.13. The Court explained that a "standard of proof allocates the risk of erroneous judgment between the litigants and indicates the relative importance society attaches to the ultimate decision." *Colorado* v. *New Mexico*, 467 U.S. at 315-316. It reasoned that, in the equitable apportionment context, the "clear-and-convincing" standard "is necessary to appropriately balance the unique interests involved in water rights disputes between sovereigns." *Id.* at 316. The Court further explained that the heightened standard "accommodates society's competing interests in increasing the stability of property rights and in putting resources to their most efficient uses" and reduces the risk of an erroneous decision "disrupting established uses." *Id.* at 316. See also *id.* at 320-321 ("Society's interest in minimizing erroneous decisions in equitable apportionment cases requires that hard facts, not suppositions or opinions, be the basis for interstate diversions."); *Connecticut* v. *Massachusetts*, 282 U.S. 660, 669 (1931) ("this Court will

not exert its extraordinary power to control the conduct of one State at the suit of another, unless the threatened invasion of rights is of serious magnitude and established by clear and convincing evidence").

Many of the reasons for applying the "clear and convincing" standard to actions for entry or modification of an interstate apportionment decree will also ordinarily be present in actions to enforce a decree. An enforcement action will involve the same "sovereign" States that are subject to the decree, and, if successful, will typically result in further relief. To be sure, as this Court explained in *Nebraska* v. *Wyoming*, *supra*, the State in an enforcement action does not need to show "injury" to justify relief, and may instead rely on the rights established by the decree. 113 S. Ct. at 1695. Thus, there often may be no significant factual issue to be resolved in an enforcement action. But when there is a factual issue to be resolved, the consequences of the resulting factual findings are much the same as in an initial apportionment action—the findings will potentially result in an injunction that upsets the status quo, by either allowing a proposed water use or enjoining an existing one. Society has a strong interest in "minimizing erroneous decisions" on such issues. *Colorado* v. *New Mexico*, 467 U.S. at 320-321.

Similar considerations suggest that the "clear and convincing" standard of proof should apply in this compact enforcement action. An interstate compact imposes limitations on sovereign States with respect to the use of a shared water resource. Furthermore, a compact enforcement action will often raise the concerns the Court has expressed about the need for correct factfinding. This case demonstrates that point. As we have explained, the Arkansas River Compact prohibits

the States from "materially depleting" available water, and hence an enforcement action under that Compact will usually depend on whether that prohibition was in fact violated. As the Special Master's report shows, that factual question can be technically complex, and an affirmative answer may have grave consequences for the offending State. In this context, the answer should be based on "hard facts, not suppositions or opinions." *Colorado* v. *New Mexico*, 467 U.S. at 320-321. Cf. *Alabama* v. *Arizona*, 291 U.S. 286, 292 (1934); *Connecticut* v. *Massachusetts*, 282 U.S. at 669.[16]

On the question of laches, we agree with Colorado and the Special Master that this Court may take into account traditional equitable principles, such as the doctrine of laches, when resolving an equitable claim by one State against another State in an original action. For example, in *Nebraska* v. *Wyoming*, *supra*, this Court resolved a dispute between two States over the priority date of a water storage facility by relying in part on a rationale akin to the doctrine of laches. The Court stated:

> We think the evidence from the prior [equitable apportionment] litigation supports the conclusion that the Inland Lakes' priority was settled there. And even if the issue was not previously determined,

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[16] In this case, the Special Master elected to apply a preponderance of the evidence standard. See 1 Rep. 65-70. Nevertheless, the application of a heightened standard would not necessarily change the outcome in this case. The Special Master concluded under the preponderance standard that Kansas had proved only its ground water pumping claim, and with respect to that claim he determined that Colorado's groundwater pump[illegible] violated the Compact regardless of the standard of proof appli[illegible] 2 Rep. 263.

> we would agree with the Special Master that Wyoming's arguments are foreclosed by its postdecree acquiescence.

113 S. Ct. at 1697 (citing *Ohio* v. *Kentucky*, 410 U.S. 641, 648 (1973)). See also *Colorado* v. *Kansas*, 320 U.S. at 394. Concepts such as laches or acquiescence are applicable to actions to enforce a compact insofar as enforcement turns on equitable principles. Cf. *Texas* v. *New Mexico*, 482 U.S. 124 (1987) (enforcing a compact through the use of equitable remedies). The fact that an equitable doctrine, such as laches, may be invoked by one State against another does not, of course, answer the question whether Colorado has made out the defense of laches on the facts of this case. See 1 Rep. 147-170.

CONCLUSION

The exceptions of Kansas to the Report of the Special Master should be overruled.

Respectfully submitted.

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JANUARY 1995

No. 105, ORIGINAL

In The

Supreme Court of the United States

October Term, 1996

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

and

UNITED STATES OF AMERICA,

Defendant-Intervenor.

ARTHUR L. LITTLEWORTH, Special Master

SECOND REPORT

September 1997

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KANSAS v. COLORADO SECOND REPORT

SECTION I

INTRODUCTION

This is my Second Report on the case. In its May 15, 1995 Opinion, the Court overruled all of the exceptions that were filed by both states to my first Report. *Kansas v. Colorado* 514 U.S. 675, 131 L.Ed.2d 759, 115 S.Ct. 1733 (1995). The case has been bifurcated into a liability and a remedies phase, and the initial Report dealt only with questions of liability. Briefly, in that Report, I recommended that the Court find that postcompact well pumping in Colorado had violated Article IV-D of the Arkansas River Compact, and that Colorado was liable on that fundamental issue. With respect to the additional Kansas claims arising from the operation of Trinidad Reservoir and from the Winter Water Storage Program, I found no violation of the compact, and recommended that Colorado and the United States should prevail on those issues. All of these recommendations were affirmed, and the case was remanded for determination of the unresolved issues in a manner not inconsistent with the Court's Opinion.

While the evidence clearly showed that postcompact well pumping in Colorado had seriously depleted Arkansas River flows into Kansas in violation of the compact, it was not possible in my first Report to quantify the amount of the depletions. Experts for both states in the trial of the liability phase relied upon complex hydrologic models from which to estimate depletions, but their results differed widely. In part, this was due to the

different pumping figures that were used in the respective models. The states also disagreed over the method of determining usable flow as required by the compact. It was necessary to settle these issues before a quantitative finding on depletions could be made. In my first Report, therefore, and while not wholly accepting the data from either state, I recommended that certain adjustments be made to the pumping data, and I set forth the methodology to be used for determining usable flow. These recommendations were approved by the Court, and the models then had to be rerun in accordance with my Report.

Following the Court's May 1995 Opinion, therefore, the remaining issues in the case were:

(a) Quantifying the depletions in Stateline flow for the period 1950-85. During the liability phase, evidence was limited to the period from 1950, when the compact became operational, to 1985 which was the last year before the Kansas complaint was filed.

(b) Quantifying depletions for the period subsequent to 1985.

(c) Bringing Colorado into current compliance with the provisions of the compact.

(d) Considering a remedy for past depletions.

This Second Report addresses the trial progress on each of these issues, and offers the Court and the parties an opportunity to review certain critical decisions before proceeding further on the issue of damages.

SECTION II

RECENT PROCEDURAL HISTORY

Following the Court's May 15, 1995 Opinion, a status conference to discuss future proceedings was held in Denver, Colorado on July 27-28, 1995. As a result of those proceedings I ordered that the trial on the remedies phase be resumed on October 30, 1995 to receive evidence on three subjects: (1) revisions to the Kansas H-I model[1] in accordance with my Report, and as affirmed by the Supreme Court; (2) Stateline depletions to the usable flow of the Arkansas River caused by postcompact pumping in Colorado for the period 1950-85, as determined by the revised H-I model; and (3) the status of efforts by Colorado to comply with the Arkansas River Compact on a current basis. A copy of the Order dated August 11, 1995 is included as Exhibit 1 in the Appendix.

In that Order I also required Kansas by November 17, 1995 to file a statement of its position with respect to damages, together with a brief in support thereof. Colorado was given until January 19, 1996 in which to file its Response, and Kansas until March 6, 1996 to reply. While the briefing schedule was later modified, these briefs have been filed and are discussed in Sections XII-XV of this Report.

Finally, I ordered that another segment of the trial be scheduled for February 19, 1996 to consider evidence on

---

[1] At the Denver conference, the states had agreed that the Kansas H-I model would be the methodology used to determine depletions.

three additional subjects: (1) Stateline depletions as determined by the H-I model for the additional period of 1986-94;[2] (2) Kansas' response to the Colorado evidence on its compliance efforts presented during the October 30 segment of the trial; and (3) continued testimony by Colorado on the status of its program to comply with the compact.

In view of the United States' decision not to take an active role in the remedies phase of the case, the Order also relieved the United States as of July 31, 1995 of its obligation to pay 20% of the fees and costs incurred by the Special Master.

Following a conference call on September 19, 1995 I issued a Supplemental Order dated September 28, 1995. This Order dealt with pumping adjustments that were to be made for declining well efficiencies, and the extent to which accretions shown by the model should be used to offset depletions. A copy of this Order is included in the Appendix as Exhibit 2.

On June 13, 1995 the State of Kansas had filed a Motion for Injunction and requested an expedited hearing. Counsel agreed upon a briefing schedule, and the motion was argued as part of the status conference in Denver on July 27-28, 1995. Kansas sought to have the State of Colorado enjoined from pumping more than 15,000 acre-feet per compact year [i.e., the amount of allowable precompact pumping] until Colorado had

---

[2] The year 1994 was the latest year in which complete data required by the H-I model were available.

guaranteed appropriate Stateline flows under the compact. That motion was denied by Order filed September 19, 1995, a copy of which is included as Exhibit 3 in the Appendix. Compliance is discussed more fully in Sections IX-XI of this Report.

By Order of December 7, 1995 the trial schedule set forth in the August 11 Order was partially amended to continue the February 19, 1996 segment to March 25, 1996, and to extend the briefing schedule on damages to January 19, 1996 for Kansas' opening brief, to May 7 for the Colorado response, and to July 26 for the Kansas reply. In addition, another segment of the trial was scheduled for June 17, 1996 to consider Kansas' position on the Colorado compliance evidence presented during earlier trial segments, and to receive any other evidence that Kansas might wish to present in regard to compact compliance.

On February 22, 1996 Kansas filed a Motion to continue the March 25, 1996 trial segment to June 17, 1996, thereby combining it with the trial segment already set for that date. Colorado objected to the Motion, and both states filed briefs in support of their respective positions. Further argument was heard by conference call on February 21, 1996, and I denied the Kansas Motion by Order dated February 22, 1996 for the reasons stated therein. A copy of that Order is included in the Appendix as Exhibit 4.

Based upon the agreement of the parties, the June 17 trial segment was later continued to June 24, and on my order was broadened to consider additional proposed changes to the H-I model for the purpose of determining 1986-94 depletions; to receive rebuttal testimony from

Kansas on the 1986-94 quantification of depletions; and to hear continued evidence on the Colorado compliance program. The Kansas response to Colorado's compliance efforts was continued to a trial segment beginning September 30, 1996. These modifications were made by Order filed April 26, 1996.

Due to the unexpected death of Brent E. Spronk, one of Kansas' chief expert witnesses, the states agreed that it would be necessary to postpone the June 24 trial segment. Accordingly, by Order dated July 10, 1996 the matters scheduled for June 24 were continued to the trial segment commencing September 30, 1996. The items heard are specified in the July 10 Order which is included in the Appendix as Exhibit 5.

This Second Report was issued in draft form on June 5, 1997. Written comments were received from the states on July 2, 1997, and oral argument on the draft report was held on July 16, 1997.

In summary, since the Court's Opinion in May of 1995, there have been 26 days of trial and argument, including testimony by 10 witnesses, and the introduction of 141 exhibits. Depletions to usable Stateline flow for the period 1950-85 were determined by Stipulation, in the amount of 328,505 acre-feet. Evidence estimating depletions for the additional period of 1986-94 is now complete, and I have found that they amount to 91,565 acre-feet, as discussed in Section VIII of this Report. Data were not available to consider depletions beyond the end of 1994. However, once the issues concerning the 1986-94 period have been settled, depletions for 1995, and 1996 if necessary, may well be agreed upon.

SECTION III

USE OF THE KANSAS H-I MODEL

In the liability phase of the trial, experts for both states relied upon computer models from which to estimate Stateline depletions. Colorado utilized four integrated models described as its "Water Budget." The Kansas "model" also consisted of a family of models, modules and sub-routines which received input in the form of certain institutional conditions as well as hydrologic data. It became known as the "hydrologic-institutional model," generally shorthanded to the "H-I model." These modeling efforts were structured so differently that a direct comparison of results was not possible. In my Report to the Court on the liability phase, I did not attempt to choose one modeling analysis over the other, but rather directed that certain data input changes be made in both. Principally, these changes related to pumping estimates in Colorado, both before and after the compact was signed, and in the method for determining usable flow. The compact provides that Stateline flows shall not be "materially depleted in *usable* quantity or availability for use . . . . " (Emphasis added) Article IV-D.

During the liability phase, Colorado experts subjected the original version of the Kansas H-I model to severe criticism, including coding errors that dramatically changed the predicted outcome of the model. The subsequent changes made by Kansas as part of its "replacement case" essentially confirmed the validity of the Colorado attack. Indeed, the corrections and revisions made to the original H-I model reduced the predicted

depletions of usable flow by almost one-half.[3] Even so, Colorado experts continued to testify to additional deficiencies in the model structure that were not changed by the Kansas replacement team.

Against this background, an announcement by Colorado's counsel during the July, 1995 Denver status conference came as a major surprise to everyone in the courtroom. Counsel stated that in view of the time, the expense, and the difficulty involved in bringing the Colorado water budget into compliance with my Report:

> "We have basically shelved that model [i.e., Colorado's own water budget] and are working with or starting to work with the HI Model. That's how we propose to proceed." RT Vol. 144 at 52.
>
> " . . . we also believe that making the changes which you directed to the HIM [i.e., the Kansas H-I model] will be relatively easy, relatively inexpensive and quick . . . We have, therefore, agreed that we will go forward based upon the Kansas testimony that the HIM is the best model to be used, and we are willing to use it." RT Vol. 144 at 62.

Kansas was openly wary of this unexpected shift, and initially stated that Kansas itself would go ahead to make the necessary adjustments to the Colorado model, and "would intend to offer the results of the Colorado

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[3] The Kansas claim, based upon the original version of the H-I model, was 917,000 acre-feet. RT Vol. 45 at 124-25. The comparable figure from the revised H-I model was 496,000 acre-feet. Kan. Exh. 651, Comparison 4.

model as well." RT Vol. 144 at 58-59. The next day, however, Kansas reversed its position. RT Vol. 145 at 5. Kansas recognized that if it were to run the Colorado water budget with the changes mandated in my report, it would cause significant delay in quantifying depletions, as well as in reaching Kansas' major objective of bringing Colorado into current compact compliance.

The unspoken paradox in this small drama was that the Colorado water budget seemed likely to show greater Stateline depletions than the Kansas H-I model. During the liability phase of the trial, Colorado's evidence showed estimated depletions of total Stateline flows for the period 1950-85 of 582,696 acre-feet. Colo. Exh. 135*, p. 6.1, Column 16; RT Vol. 134 at 13; RT Vol. 117 at 75, 102. These were depletions to total flow, not to usable flow as required under the compact. They would have been somewhat less when reduced to usable flow, but Colorado did not make that analysis. However, the Colorado depletions were also on the low side because they were based upon substantially less pumping than the amount determined in my Report. Colorado used 95,925 acre-feet as the amount of average annual pumping as compared to Kansas' pumping estimate of 150,394 acre-feet. Kan. Exh. 731; RT Vol. 133 at 53-54.

Thus, while Colorado's estimated depletions of 582,696 acre-feet cannot be directly compared to the Kansas claim of 489,000 acre-feet (which represented depletions of usable flow), Kansas did make an effort to compare the two models using similar data. Kansas ran its own H-I model but used the lower Colorado pumping figures. The result showed depletions of 395,000 acre-feet

as compared to the Colorado water budget estimate of 582,696 acre-feet. Kan. Exh. 642; RT Vol. 127 at 93.

More recently, Colorado's expert witness, Duane Helton, testified to several reasons why the Colorado water budget should not be used to determine future depletions, concluding that it "overestimated the calculations of depletions at the state line." RT Vol. 153 at 19-20, 22. On the other hand, he testified that the H-I model (as then updated by Colorado) was "reasonable for calculating depletions during the extended period." [i.e., 1986-94] RT Vol. 153 at 22.

Both states, therefore, approached the October 30, 1995 trial segment with the intent to rely upon the H-I model to determine depletions for 1950-85, as well as for the extended period of 1986-94.

SECTION IV

STATELINE DEPLETIONS FOR PERIOD OF 1950-85

The required changes to Kansas' H-I Model for the 1950-85 period were made without significant dispute, although certain controversies were settled by my Order of September 28, 1995. Appendix Exhibit 2. Basically these changes involved modifying the precompact pumping allowance from an average of 11,000 acre-feet annually to 15,000 acre-feet; adjusting Kansas' postcompact pumping figure of 5,810,000 acre-feet in accordance with Colorado's evidence on declining pump efficiencies and nonelectric pumping; and employing the Durbin methodology, using Larson's coefficients, to determine usable flow. Jt. Exhs. 174-177. With these revisions, the H-I model calculated depletions to usable Stateline flow caused by postcompact pumping in Colorado for the period 1950-85 in the amount of 328,505 acre-feet. This result allowed predicted depletions to be offset by accretions shown by the model during the same irrigation season. Jt. Exh. 178, 179; RT Vol. 146 at 9, 15-18.

At the outset of the October 30, 1995 trial segment, the States filed a Stipulation as a "compromise between Kansas and Colorado for the complete and final settlement" of the 1950-85 depletions. The amount is 328,505 acre-feet. A copy of the Stipulation is included in the Appendix as Exhibit 6.

SECTION V

UPDATING THE H-I MODEL FOR THE 1986-94 PERIOD

The states also agreed upon much of the additional data input to the H-I Model required for the 1986-94 period. Those data included irrigated acreage, transmountain deliveries, ungaged tributary inflow, phreatophyte consumption, rainfall and evaporation values for John Martin Reservoir. Kan. Exh. 773; RT Vol. 152 at 27-29. The new data showed a reduction in the irrigated acreage in Colorado of approximately 25,000 acres. The 1950-85 acreage figure used in the H-I Model was 313,867; the 1994 model figure was 288,774. Kan. Exhs. 759, 786; RT Vol. 150 at 12. This was due mainly to the "dry-up" of certain lands by the cities of Colorado Springs and Aurora, and the acquisition of those water rights for future municipal use. RT Vol. 149 at 163; RT Vol. 150 at 11-13.

A. Pumping Data.

Initially, the states were unable to agree on the amount of pumping that occurred during the extended period. The Kansas estimate for total pumping from 1986 through 1994 was 1,360,026 acre-feet. Kan. Exhs. 757, 784. For modeling purposes, the precompact pumping allowance would then be deducted. RT Vol. 153 at 12. The annual average for this period came to 151,114 acre-feet. In comparison, Colorado's estimate of total pumping was 1,238,987 acre-feet, with an annual average of 137,665 acre-feet. Kan. Exh. 784.

In compiling its pumping data, Kansas experts followed generally the same approach used in the liability phase, as approved in my Report. Colorado, on the other hand, took advantage of the recent data reported under its new Measurement Rules and assigned individual power records to individual wells. RT Vol. 150 at 29. Kansas acknowledged that the Colorado methodology would produce more accurate estimates if their figures were "all right." RT Vol. 150 at 32. After checking the Colorado data, Kansas agreed to use the Colorado pumping data to determine depletions for 1986-94, but in a written Stipulation Kansas reserved its rights for future determinations. A copy of that Stipulation is included in the Appendix as Exhibit 7.

These pumping data were incorporated by Kansas into its March 1996 version of the H-I model, showing Stateline depletions of usable flow (offset by seasonal accretions) for the period 1986-94 in the total amount of 91,565 acre-feet.[4] Kan. Exh. 787. Colorado, however, did not agree with certain of the changes made by Kansas to the H-I model, and using the earlier version of the model, Colorado calculated depletions for 1986-94 at 30,700 acre-feet. Colo. Exh. 1040.

B. Coding Changes to the H-I Model.

In addition to the new data input for the 1986-94 period, Kansas also made certain coding changes to the

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[4] Using Kansas' initial pumping estimates, depletions were estimated by Kansas to be 98,637 acre-feet. RT Vol. 151 at 88.

model. Kan. Exhs. 756, 773. These included several technical modifications to better replicate the historical operations of John Martin Reservoir, and modifications to the operations of the Rocky Ford and Colorado Canals to reflect transfers of water rights for municipal use. Colorado was in agreement with most of these revisions, but strongly opposed the changes which Kansas made to the model's maximum farm efficiency. This value defines the maximum amount of irrigation water available to the crop, after losses, as a percentage of the water deliveries to the farm. Losses (i.e., water not used by the crop) consist of tailwater runoff, on-farm lateral losses, and deep percolation beyond the root zone of the crop. This maximum efficiency factor becomes critical in the model's calculations of Stateline depletions. As the factor is lowered, depletions increase, and vice-versa. RT Vol. 152 at 14. A good portion of the trial was devoted to this subject, which is discussed in detail in Section VI.

C. Calibration of the Updated Kansas Version of the H-I Model.

Because of the nine years of added data, the changes in the simulation of John Martin Reservoir operations, and the reduction in the maximum effective farm efficiency, Kansas experts believed that it was necessary to recalibrate the model. Kan. Exh. 773; RT Vol. 151 at 74. Predicted model output was compared with observed values over the full period from 1950 to 1994, and Kansas experts testified to the reasonableness of the results. RT Vol. 151 at 108, 145-46. Calibration was achieved by

adjustments to these parameters: SEV values (which calculate nonbeneficial consumptive use of water); monthly Stateline demands with the 1980 Resolution in effect; WANT factors for several canal systems; and restoration of canal capacities for the Fort Lyon, Holbrook and Lamar Canals. Kan. Exh. 773 at 12-13. Kansas experts testified that all of the changes made in the updated Kansas version of the H-I model were needed and improved the model's performance; indeed, that the prior version should no longer be use RT Vol. 151 at 91, 97-98; RT Vol. 150 at 64; RT Vol. 151 at 135; RT Vol. 152 at 6, 17-18. The calibration results of the updated Kansas version of the H-I model are found in Kansas Exhibits 760 and 761, and discussed by their experts at RT Vol. 151 at 77-83 and RT 151 at 131-140.

Dewayne R. Schroeder, an engineer employed by the Colorado Division of Water Resources, is Colorado's expert on the H-I model. Early in the proceedings, he had been assigned to the sole task of reviewing and understanding the Kansas model, and was one of the first experts to uncover some of the errors and deficiencies in the original version of the H-I model. However, even after the model had been substantially revised by Kansas' replacement experts, Schroeder continued to voice strong reservations about its accuracy. Primarily, his concerns stemmed from certain "restrictive" factors imbedded in the structure of the model, i.e., the diversion reduction factors, the reduced canal capacities, and the low WANT factors. Yet each of these parameters was stoutly defended by the Kansas experts as being a commonly used modeling technique, necessary in this case to match predicted with actual diversions of stream flow.

Nonetheless, given the decision by both states to use the H-I model for the 1986-94 period, Mr. Schroeder took the model version used to stipulate to the 1950-85 depletions, added the nine years of data input agreed upon, and made a limited number of coding changes. Generally the coding changes were the same as the Kansas modifications, but he did not include Kansas' new farm efficiency factors, or Kansas' change to the SEV values, or all of Kansas' changes affecting the operations of John Martin Reservoir. Colo. Exh. 1025; RT Vol. 152 at 36, 38. This version of the H-I model was referred to as the "Colorado updated H-I model." RT Vol. 151 at 136-37; RT Vol. 152 at 38. Colorado also undertook calibration studies, the results of which appear in Colorado Exhibits 1026-36 (including those with an asterisk), and are discussed in RT Vol. 152 at 39-55.

Model calibration, however, does not necessarily assure accuracy of the model results. These two updated and calibrated models produced widely disparate results. For the period 1986-94 the Kansas updated H-I model, using Colorado's pumping figures, calculated depletions of usable Stateline flow in the total amount of 91,565 acre-feet. Kan. Exh. 787. The Colorado updated H-I model calculated 30,700 acre-feet. Colo. Exhs. 1037, 1040; RT Vol. 152 at 57. Calibration is not necessarily "unique." That is, it may be achieved by adjusting different model parameters, and depends in part upon judgment and experience. RT Vol. 151 at 71, 119; RT Vol. 152 at 20.

Mr. Schroeder testified that both models were calibrated to "more or less the same extent." RT Vol. 152 at 44. So far as calibration was concerned, he thought that each model was "just as good as the other." *Id.* at 38. Yet

he testified that both the Colorado and Kansas versions of the updated H-I model were "inappropriate and inaccurate as they presently exist."[5] RT Vol. 152 at 72. This rather unusual conclusion stems from his consistent objections to the use of restrictive factors in the H-I model, and the fact that both versions of the updated model included these parameters. As a result, Mr. Schroeder testified, "I don't know what an accurate depletion [for 1986-94] would be."[6] RT 152 at 110.

D. H-I Model's Ability to Predict Depletions.

The principal cause of the different depletion estimates for 1986-94 does not depend on which model is better calibrated. Rather, the spread comes from the different maximum farm efficiency factors used by the two states, and the consequent change made by Kansas to the SEV values. RT Vol. 152 at 61, 66. The version of the H-I model used by Kansas during the liability phase of the trial had an effective maximum efficiency of 87 percent. That is to say, the model allowed consumptive use by the crops to rise to a maximum of 87 percent of the water delivered to the farm, and thus, under those circumstances, restricted tailwater runoff and deep percolation

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[5] Although he added that the Colorado version was "more appropriate" because it did not include a "selective" change, namely, in the maximum farm efficiency factor. RT Vol. 152 at 72-73, 82-83.

[6] However, Colorado's other expert witness, Duane Helton, testified that the results of the updated Colorado H-I model were "reasonable" for calculating 1986-94 depletions. RT Vol. 153 at 18-19, 21-22.

to 13 percent. Experts for both states at one point or another during the trial testified that a maximum limit of 87 percent was too high, although Colorado witnesses maintained that the factor should not be "selectively" changed. Reducing the efficiency percentage has the effect in the model of increasing Stateline depletions, and Colorado argued that if the maximum farm efficiency factor is lowered, then the restrictive factors in the model that act to increase depletions must also be addressed.

Colorado, in the water budget model which it used earlier, employed a maximum farm efficiency factor of 75 percent. RT Vol. 153 at 27. Kansas in its updated H-I model reduced the effective 87 percent maximum to 65 percent for most canals, with two set at 70 and 75 percent. Colorado, on the other hand, retained the 87 percent in its updated version of the H-I model. RT Vol. 153 at 27. When Mr. Schroeder made a run of the Colorado updated H-I model using a 75 percent maximum farm efficiency, the Stateline depletions to usable flow increased to between 60,000 and 70,000 acre-feet for the 1986-94 period. RT Vol. 152 at 117. This was in contrast to Colorado's estimate of depletions of 30,700 without such change. The maximum farm efficiency, however, is not the only evidence that needs to be considered in the choice of model results.

The Colorado updated H-I model calculates that over one million acre-feet of pumping during 1986-94 causes only 30,700 acre-feet of depletions of usable Stateline flow. On its face, this model result seems questionable, even considering the fact that transmountain imports increased by about 10,000 acre-feet annually over the

1950-85 average, and that the percentage of return flows from such deliveries also increased. RT Vol. 153 at 16-18.

For the 1950-85 period, the original Colorado water budget used in the liability phase calculated the ratio of depletions of Stateline flow to pumping as 16.9 percent. For the same period the updated Kansas H-I model was almost identical, at 16.7 percent. But making the same comparison for the 1986-94 period, the Kansas updated H-I model showed depletions as 14.1 percent of pumping while the Colorado updated H-I model calculated only 6.3 percent. Kan. Exh. 765; RT Vol. 151 at 137-39.

The Colorado updated H-I model retained the use of 87 percent as the maximum farm efficiency. This percentage, as opposed to the 75 percent used in the Colorado water budget, or the 65 to 75 percent range used in the Kansas updated version of the H-I model, was generally acknowledged to reduce Stateline depletions.

Mr. Helton recognized that using the 87 percent factor in the H-I model during the liability phase led to low estimates of deep percolation, which, in turn, "underestimated depletions at the state line." RT Vol. 153 at 19. He thought, however, that other deficiencies in the model overestimated depletions. And he concluded that "on a long-term basis, those deficiencies ought to compensate, and the end result of that ought to be somewhat reasonable." *Id.*

There is also evidence that the Kansas H-I model used for the 1950-85 period produced a low estimate of Stateline depletions. Colorado's new Use Rules that imposed strict regulations on pumping were protested and the subject of a trial in the Colorado District Court,

Water Division 2, at which both Colorado experts, Helton and Schroeder, testified. The Court in its April 30, 1996 decision upholding the new Rules referred to Helton's testimony:

> "Helton believes the Colorado Water Budget Analysis overestimates depletions and that the model in question [i.e., the H-I model before being updated for 1986-94] *underestimates depletions.*" Colo. Exh. 1051, Appendix A at 12, emphasis added.

Kansas expert Book was also of the opinion that the depletions shown by the version of the H-I model used by Kansas during the liability phase of trial were low. RT Vol. 150 at 64.

Moreover, Mr. Schroeder acknowledged on cross-examination that if pumping variations were removed, the Kansas updated H-I model would produce about the same amount of depletions as the original Colorado water budget model used during the liability phase. RT Vol. 152 at 116-17.

There is no way to prove the accuracy of either state's modeling efforts, but there are solid indications that the H-I model as used by Kansas during the liability phase of the trial, and now used by Colorado for 1986-94, may well underestimate depletions. The fact that the Colorado water budget may also have overestimated depletions does not detract from an apparent need to adjust the H-I model, which is now being relied upon by both states to determine depletions for 1986-94. Whether the specific changes incorporated by Kansas into its updated version of the H-I model are proper is a separate issue discussed later in this Report.

SECTION VI

THE MAXIMUM FARM EFFICIENCY FACTOR

The original version of the H-I model effectively limited farm irrigation efficiency to 87 percent for all canal systems. RT Vol. 150 at 48. The effective maximum farm irrigation efficiency was not reviewed or changed when the "replacement experts" made their revisions to the model. RT Vol. 150 at 69-70. The importance of this technical and seemingly obscure modeling parameter lies in the fact that Stateline depletions are "extremely sensitive" to the percentage that is applied. RT Vol. 150 at 74.

Kansas' expert, Dale Book, first became concerned in October of 1995 about unreasonable estimates of irrigation return flows in the Kansas model. RT Vol. 150 at 64-66. At that time the model had already been used as the basis for the Stipulation determining the 1950-85 depletions. The Colorado State Engineer was also then beginning to use the H-I model to check certain presumptive stream depletions that were part of Colorado's new proposed rules to regulate pumping in Colorado. For wells used to supplement a canal supply, the new rules presumed that depletions to the Arkansas River would equal 30 percent of the amount pumped; for wells that were the sole source of irrigation water, the presumed depletions were 50 percent; and for sole source sprinkler systems, the presumed depletions were 75 percent. Colo. Exh. 1018, Rule 4.2. Depletions were required to be made up with replacement water, and relying upon the results of the H-I model using these percentages, the Colorado State Engineer believed that Stateline flows would be fully protected. RT Vol. 150 at 65. Mr. Book, however,

thought that the presumptive depletions should have been higher, and he set about "to try to figure out what was going on." RT Vol. 150 at 65-66.

The Kansas experts concluded that the 87 percent effective maximum farm efficiency in the H-I model was causing it to overestimate the consumption of applied irrigation water, to underestimate return flows to the river from tailwater and deep percolation, and thereby to underestimate depletions at the Stateline. RT Vol. 150 at 53, 64-66. The Kansas experts then implemented a maximum farm efficiency factor. In due course, after reviewing available evidence and making trial runs of the model using figures between 55 and 75 percent, the Kansas experts selected maximum farm efficiency factors of 65 percent for all of the canal systems except two. Those were set at 70 percent, and the Stateline pumpers were assigned 75 percent. RT Vol. 150 at 76-77; Kan. Exh. 776. In recalibrating the model, the SEV values in the model which determine the noncrop consumptive use of water were also adjusted. RT Vol. 150 at 54-55. It is with the inclusion of these changes that the Kansas updated H-I model calculates depletions to usable flow for 1986-94 in the amount of 91,565 acre-feet. RT Vol. 150 at 48; Kan. Exh. 787.

Colorado did not object, *per se*, to the use of a maximum farm efficiency factor. Nor did it attempt to defend 87 percent as being a reasonable maximum farm efficiency in the Arkansas Valley. Indeed, Colorado had used a factor of 75 percent in its own water budget model. RT Vol. 150 at 49; RT Vol. 151 at 33, 48-51. Moreover, Colorado experts had testified to the 87 percent figure as one of the "deficiencies" attributed to the H-I model during

the liability phase of the trial. RT Vol. 111 at 45-46. RT Vol. 115 at 61; RT Vol. 133 at 101-06. RT Vol. 151 at 102. Through detailed analyses of the H-I model results with respect to each canal system, Colorado experts had uncovered the fact that the effective maximum farm efficiency of 87 percent caused the model under certain conditions to calculate absolutely no deep percolation for an entire canal system. (For example, see Colo. Exh. 997 and Kan. Exh. 770, Vol. I for the Colorado Canal; RT Vol. 151 at 24-28.) Kansas initially had not checked the model results in a similar fashion. RT Vol. 151 at 63; RT Vol. 152 at 9-10.

However, Colorado did object strongly to the change in the maximum farm efficiency as being "selective," that is, a late change that served to increase Stateline depletions while offsetting factors that tended to overestimate depletions were left intact. RT Vol. 152 at 125. In addition, the Colorado experts believed that the maximum farm irrigation efficiency values selected by Kansas for its updated version of the model were not reasonable for the Arkansas River Basin. *Id*. Mr. Schroeder later attempted to remedy what Colorado perceived as this "selective change" by removing the so-called restrictive factors (diversion reduction factors, reduced canal capacities and low WANT factors) from the H-I model. In Colorado's view these restrictive factors tended to cause depletions to be overestimated. RT Vol. 153 at 19. The results of that modeling effort are discussed in Section VII.

A. Kansas' Evidence on Farm Irrigation Efficiency.

To support an appropriate model value for irrigation efficiency, Kansas engaged a new expert witness, C. Eugene Franzoy. His qualifications are found in Kansas Exhibit 785. His experience in agricultural engineering and irrigation efficiencies is extensive, including testifying as an expert witness in a number of cases. The most prominent of these cases was the interstate water dispute in *Texas v. New Mexico*. Currently he is also working on another interstate water case, *Nebraska v. Wyoming*, which he said was "similar to this case." RT Vol. 150 at 88. His experience in performing field evaluations of irrigation efficiencies ran into the hundreds. RT Vol. 157 at 17-18.

His first field trip through the area was in January, 1996, at a time when no irrigation was occurring. Nonetheless, he was able to observe the general topography and field slopes, the types of soil, the size and configuration of fields irrigated by the various canals, the irrigation methods used, and the presence of any return flow reuse systems. Kan. Exh. 774. Soil survey maps provided by the United States Natural Resources Conservation Service, formerly the "Soil Conservation Service," were also used, together with data on irrigated acreage by canal service areas and crop distributions. The results of his initial work are found in Kansas Exhibit 774.

The purpose of his initial work study was to determine the achievable on-farm efficiencies of farms in the Arkansas Valley. For purposes of his report, he defined achievable efficiency as the "maximum on-farm efficiency achievable for the existing physical conditions, assuming

a high level of management." Using this definition, efficiency becomes "a measure of the ability of the soil to absorb and retain sufficient water for crop use given the existing intake rate, slope, topography and field length." *Id.* at 3. In more specific terms, the irrigation efficiency is the percentage of applied water that is consumed by the crop. RT Vol. 150 at 45. For example, if the farm efficiency were 65%, it would mean that 65% of the applied irrigation water was consumptively used by the crop, and the remaining 35% either percolated to groundwater, or ran off the farm as tailwater. RT Vol. 150 at 111-112.

In Mr. Franzoy's opinion, achievable efficiencies in this case were largely determined by the soils and slope of the fields. However, he felt that "slope was the dominant factor, because the soils are close enough to be the same." RT Vol. 150 at 115, 120. Mr. Helton agreed that slopes were "a controlling factor." RT Vol. 152 at 130. Of course, there are also other factors that influence irrigation efficiencies, for example, the type of crop, the depth of the rooting system, the presence of salts or silt in the irrigation water, the type of irrigation system, and the available water supply. RT Vol. 150 at 118-19; Kan. Exh. 774 at 10.

Mr. Franzoy characterized the topography of the Arkansas River Valley as rolling terrain, sloping toward the river on both sides and also towards several tributary drainage areas. Kan. Exh. 774 at 10; Kan. Exh. 801 at 5-6. The soils were relatively flat in the bottom of the valley

along the river, but slopes reached 2 percent at the edge of the irrigated areas.[7]

Kan. Exh. 774 at 2, 10. The majority of the areas farmed had slopes exceeding 0.5 percent. *Id.* at 10. Soil Conservation Service data confirm Franzoy's slope estimates. *Id.*, Table 2. Above slopes of 0.5 percent, Franzoy testified that irrigation efficiencies decrease. *Id.* at 14; RT Vol. 159 at 151. In his opinion, irrigation water would be difficult to control in most of the valley because of slopes that were greater than 0.5 percent and ran both parallel and perpendicular to the direction of irrigation. Kan. Exh. 801 at 5. Franzoy's estimates of the "on-farm" efficiencies achievable in each of the canal systems are found in Kansas Exhibit 774.

In April 1996 Mr. Franzoy again toured the valley, this time when crops were being irrigated. His specific purpose was to look at tailwater, and the opportunities for reuse of tailwater within a canal system, and to estimate irrigation efficiency on a system-wide basis as opposed to individual farms. RT Vol. 156 at 131-32; RT Vol. 157 at 61. The maximum farm efficiency factor in the H-I model operates on a canal system as a whole.

As a result of this additional work, Franzoy estimated the reuse of tailwater for each canal system, and increased his original irrigation efficiencies for seven of the canals. Kan. Exh. 801, Table 2. He testified that it is not easy to estimate maximum farm efficiency "on a ditch-wide" basis, and that more judgment is involved

[7] A one percent slope equals a one-foot change in elevation over 100 feet of distance. RT Vol. 150 at 151.

than in measuring efficiency on an individual field. RT Vol. 157 at 62. Even so, in his opinion, a maximum irrigation efficiency of 87 percent was not reasonable, and 75 percent was high. RT Vol. 150 at 136. "You are not going to hit 75 percent over an entire season . . . " RT Vol. 159 at 166-67 (Franzoy). Mr. Franzoy's estimates in Table 1 of Kansas Exhibit 801 were based on achievable efficiencies over an irrigation season. RT Vol. 156 at 135; RT Vol. 159 at 148, 166. Mr. Franzoy testified that he reviewed his conclusions with Brice E. Boesch of the Natural Resources Conservation Service (formerly the federal Soil Conservation Service) who also disagreed with 75 percent, and thought that Franzoy's figures were "reasonable." RT Vol. 160 at 22; Kan. Exh. 774 at 12. Mr. Helton also called Boesch, but only to verify Franzoy's contact. Helton did not solicit Boesch's substantive views. RT Vol. 159 at 19-21.

Mr. Franzoy's April tour produced a number of photos showing considerable amounts of tailwater in washes and drains, and ponded at the lower ends of fields. Kan. Exh. 801. These pictures did not support the Colorado claim of extensive reuse of tailwater, even in the "water short ditches."[8] However, Mr. Helton pointed out that April of 1996, at the time of Franzoy's tour, was unusual in that water was being released from storage in order to gain reservoir space for flood control purposes. RT Vol. 158 at 31. The month was not representative of water short conditions, he said. RT Vol. 159 at 128. For example,

[8] The Amity, Colorado, Fort Lyon, Holbrook and Otero Canals. Colorado emphasized tailwater reuse in these systems because of their general need for more water.

he testified that Fort Lyon diverted 22,622 acre-feet in April contrasted with an average of 12,501 acre-feet for the 1950-85 period. RT Vol. 159 at 127. Other evidence, however, indicated that April 1996 was not that unusual. During the 1986-94 period, Fort Lyon's April diversions exceeded the 1996 amount in four of the nine years. *Id.* at 128-30. Moreover, when Franzoy was there on April 23-24, Fort Lyon was calling for more water under its 1887 second priority, which meant that it was not "getting all the water it needed." Kan. Exh. 850; RT Vol. 159 at 32-35.

B. Colorado's Evidence on Farm Irrigation Efficiency.

Colorado's evidence on this subject was presented through two experts: Duane D. Helton and Prof. Robert E. Walker. Mr. Helton has been a chief expert for Colorado throughout the trial, and his 27 years of experience along the Arkansas River clearly make him the most knowledgeable witness about conditions generally in the Arkansas River Valley. Professor Walker was a new expert witness who has been in the agricultural engineering department at California Polytechnic University, San Luis Obispo, for the last 13 years. RT Vol. 158 at 45. He is a full professor at that university.[9] Prof. Walker also has had personal experience with irrigation in the Arkansas Valley. He was employed from 1972 to 1976 by Foxley and Company (a large cattle feeding operation) and was responsible for the irrigation of about 3500 acres in the

[9] His resume appears in Colo. Exh. 1053.

Colorado Canal system. RT Vol. 158 at 47-48. Prior to that time, in 1968-72, he worked for the Soil Conservation Service in Southern California. However, he had never testified before as an expert witness on irrigation efficiency. *Id.* at 51.

The primary thrust of Mr. Helton's testimony was that Franzoy had failed to give sufficient recognition to the extensive reuse of tailwater, and the practice of deficit irrigation in the Arkansas River Valley. Even with the adjustments that Franzoy made after his April inspection, Helton believed that the Kansas efficiency percentages were still low, and that the maximum irrigation efficiency factor in the H-I model for use during 1986-94 should be 75 percent.

Helton and Prof. Walker also made an inspection tour of the valley in September 1996. RT Vol. 157 at 125. Because of the access they enjoyed as Colorado experts to go on certain Colorado farms, they were able to see features not visible to Franzoy. They too introduced a large number of photographs and maps, concentrated primarily in the Bessemer, Fort Lyon and Amity Canal Systems. Colo. Exh. 1055, 1056, 1056 B-E. These exhibits were intended to demonstrate in part the use of tailwater from one field as irrigation supply to the next lower field. Sometimes Mr. Helton referred to this as the "multiple reuse" of tailwater, and sometimes as examples of water being "successively used." RT Vol. 157 at 152, 164-65, 182; RT Vol. 158 at 24; RT Vol. 152 at 126-27; Colo. Exh. 1055, photo 23 D. The evidence suggested as many as seven fields where water could be successively used. RT Vol. 157 at 164-65. Later testimony, however, by both Mr. Franzoy and Prof. Walker, showed that tailwater from one

field that is used as part of the irrigation supply of a lower field is essentially consumed in that first reuse. RT Vol. 159 at 145-47, 149; RT Vol. 158 at 119-22. Franzoy found references to the "multiple" reuse of tailwater to be misleading. RT Vol. 159 at 149.

The practice of deficit irrigation was acknowledged to be prevalent in the Arkansas River Valley. When a full irrigation supply is not available, farmers tend to under-irrigate a lower field or portion of a field, and accept the consequent reduction in crop yield. This is particularly true of alfalfa, a major crop in the valley, which can withstand a water shortage and still recover with a full yield when more water again becomes available. Mr. Helton cited the practice as another demonstration of Colorado's efficient use of a limited water supply. But as Mr. Franzoy pointed out, the major impact of deficit irrigation is to reduce tailwater runoff as opposed to a reduction in deep percolation losses. RT Vol. 159 at 160-61. In that sense, it runs counter to Colorado's attempt to establish a high irrigation efficiency based on tailwater reuse.

Mr. Helton also pointed to certain engineering reports and court approved water transfers that he believed tended to support his 75 percent efficiency figure. The actual percentages in each of these sources was lower than 75 percent, but he testified that certain adjustments were required in order to allow a comparable comparison. With these adjustments, Mr. Helton said that the following irrigation efficiencies were comparable to his 75 percent: 68.8 percent for a Colorado Canal transfer, 70 percent for a Rocky Ford Canal transfer, 72 percent for a proposed transfer in the Keesee Ditch, and 75 percent

for a transfer in the Fort Lyon Canal. RT Vol. 159 at 53-58, 100, 109-11, 116-17; Jt. Exhs. 79, 80, 156.

Colorado law permits the transfer only of the consumptive use portion of a diversion right. That is, the law protects the return flows to the stream system, and does not allow the transfer of tailwater runoff, deep percolation, or canal and lateral seepage. RT Vol. 159 at 45-46. These irrigation efficiency estimates are a way to reach the approximate amount of water actually consumed by the crop in a particular transfer situation. In the H-I model, the maximum farm efficiency value is not the same as a one-time highest efficiency that can be measured in a ditch system. RT Vol. 157 at 109-11. The factor in the model determines the maximum amount of water, on a monthly basis, over an entire user service area, that is made available for use by the crop. *Id.*

Mr. Helton was faced with the testimony of a prior Colorado witness who expressed a different opinion on the irrigation efficiencies of the various canal systems. Donald L. Miles was an expert witness for Colorado during the liability phase of the trial. His complete testimony embraced a variety of subjects (e.g., pump efficiencies, salinity, subirrigation, winter irrigation practices) but a significant segment dealt with irrigation efficiencies. RT Vol. 66 at 8-47, 91-96. Mr. Miles was extremely well qualified, having been born and raised along the Arkansas River, and having been employed from 1973 to 1988 by Colorado State University as its extension irrigation engineer stationed at Rocky Ford. RT Vol. 65 at 123-25. His job was to work with farmers along the Arkansas River in Colorado to improve their irrigation practices and water resource management. *Id.* at 134-36.

Mr. Miles estimated the farm irrigation efficiencies for most of the canal systems, with the range varying from 30 to 70 percent. The water short canals, with which Colorado was most concerned, fell between 50 and 65 percent, except for the Colorado Canal at 70 percent. RT Vol. 66 at 91-96; Kan. Exh. 772. Mr. Helton pointed out appropriately that Miles' figures were average values, not the maximum efficiencies used in the H-I model. RT Vol. 66 at 145, 150. Mr. Franzoy also recognized that these were estimates of actual as opposed to achievable efficiencies, although in the water short ditches he thought the values were close and would be comparable. RT Vol. 157 at 87-88; Kan. Exh. 801 at 6.

Mr. Miles also spoke about the "clear water effects" resulting from the construction of Pueblo Reservoir, which removes much of the silt from the River leaving clear water to be released for irrigation. Colo. Exh. 89 at 43-44. Clear water soaks into the soil at the upper end of the field much more easily than muddy water. *Id.* With more silt, the mud tends to seal the furrows at the upper end of the field. But with clear water, the sealing effect does not occur, and it is often difficult to keep from over-irrigating the upper end of the field, reducing the irrigation efficiency. RT Vol. 65 at 161-64. In Mr. Miles' opinion the increase in seepage, in the canals and on the farms, from the use of more clear water had been "very significant" in the river reach between Pueblo and John Martin Reservoirs. *Id.* at 168-71. Entirely apart from the clear water effect, Miles testified that it was fairly common practice to run water for about 12 hours, 9 or 10 of which would be required to get the water through the field. As a

result, "the lower end of the field is usually under-irrigated, while the upper end is often over-irrigated." Colo. Exh. 89 at 43.

Prof. Walker did not have an opinion on what the maximum farm irrigation efficiency values should be, although he thought that Mr. Franzoy's estimates were flawed and that his numbers should be moved upward. RT Vol. 158 at 93. Asked whether he thought Franzoy's adjustments of about 5 percent made for tailwater reuse were sufficient, he said that he didn't feel "qualified to really quantify that." *Id.* at 93. Asked specifically whether he believed that Franzoy's percentages in Kansas Exhibit 801, Table 1, were "realistic or appropriate," he replied that all he could rely upon was his Foxley experience where he personally measured an efficiency of 80 percent. *Id.* at 150. That was a summer measurement, however, and an earlier spring measurement that he made showed an efficiency of between 20 and 30 percent. *Id.* at 151-52.

Professor Walker apparently did not fully understand Franzoy's two reports, and the reasons for his efficiency percentages. Professor Walker was of the opinion that Franzoy had based his numbers on "border strip irrigation,"[10] and that using the 0.5 percent limit developed for

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[10] Border strip irrigation is where the field is confined by ridges and the area between the ridges is filled with a sheet of water. RT Vol. 158 at 128. There was no evidence that this type of irrigation was prevalent in the Arkansas Valley. The predominant irrigation methods were furrows and corrugations. Colo. Exh. 1053 at 1.

border strips could underestimate the maximum achievable farm efficiencies for furrow corrugation[11] irrigation "by as much as 10 to 15 percent." Colo. Exh. 1053 at 1. In support of his opinion, Professor Walker could point to only one reference in Franzoy's first report (Kan. Exh. 774 at 12) where the term "border strip" was even mentioned. RT Vol. 158 at 130-32. Franzoy's second report had no reference at all to border strip irrigation, and Professor Walker had not reviewed Franzoy's earlier testimony. *Id.* at 130, 132. In fact, the only references in Mr. Franzoy's initial report were merely part of his literature review which mentioned a 1983 article and a 1995 paper to the effect that border strip irrigation is best suited to slopes of less than 0.5 percent. Kan. Exh. 774 at 12. These references give no support to Professor Walker's opinion, and Mr. Franzoy testified that Professor Walker's assumption was not correct. RT 159 at 150.

Moreover, Professor Walker seemed to confuse the data shown on Franzoy's Table 1 of his second report. Kan. Exh. 801. A copy of that Table is included as Exhibit 8 in the Appendix. He finally acknowledged, "I misinterpreted, then, what he [Franzoy] was saying." RT Vol. 158 at 137. He seemed to assume that Column (1) in Table 1 represented Franzoy's estimate of efficiency based on a 0.5 percent slope; that Column (2) then depicted the actual slope; and in Column (3) Franzoy downgraded the

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[11] A corrugation is simply a depression forced by a skid or roller into otherwise flat ground. RT Vol. 66 at 139. In Mr. Miles' opinion it results in "very inefficient irrigation," though it is used on "quite a lot of the acreage" in the Fort Lyon system. *Id.* at 140.

efficiency to the extent that the slope exceeded 0.5 percent. Professor Walker used the Bessemer Canal as an example: he said Column (1) showed a maximum efficiency of 55 percent; Column (2) listed the dominant slopes at 0.5 and 1.0 percent; and Column (3) Franzoy therefore downgraded the 55 percent efficiency to 35 to 50 percent. RT Vol. 158 at 135-137. Clearly this was not a correct interpretation of the Table. Franzoy's estimate of maximum system efficiency was shown in the far right column, not in Column (3), and for Bessemer the estimate was actually 60 percent. The figures in Column (3) came from the Soil Conservation Service data sheet "for graded furrow and sprinkler" irrigation, as the footnote plainly showed. Column (3) was obviously inserted for comparison purposes, but those percentages were not Franzoy's opinion; nor did they represent a reduction of Column (1) figures because of slope.

In Professor Walker's opinion, "good management compensates for different slopes." RT Vol. 158 at 98. He testified that good management can handle tailwater on a one percent slope, and that a good farmer can farm a one percent slope just as easily as a 0.3 percent slope. RT Vol. 158 at 99, 145, 146. However, there is nothing cited in the literature to support this view; nor did Professor Walker show specifically how this could be done. Mr. Franzoy disagreed that management could "fully compensate" for slopes over 0.5 percent, and he cited examples. RT Vol. 159 at 150-59. With Arkansas Valley soils, and a slope of one percent, Franzoy said the inherent irrigation efficiency is about 40 percent. But applying proper irrigation management such as scheduling, alternate row irrigation, and tailwater reuse, Franzoy testified efficiency could be

boosted by 10 to 20 percentage points, but not up to 75. *Id.* at 151-52. As the slope increases, so does the velocity of the water, and the depth of the water in the furrow will go down. *Id.* at 151. Erosion is one of the reasons that management cannot overcome all of the effects of slope. *Id.* at 156. That is why farmers sometimes go to the major expense of land leveling. *Id.* at 154, 157. I conclude that Mr. Franzoy's opinion, which also finds support in the Soil Conservation Service material, is the more realistic view of achievable irrigation efficiencies. *Id.* at 156-58; Kan. Exh. 801, Table 1.

C. Conclusion.

A clear analysis of the maximum farm irrigation issue is handicapped by differences in definition, in the use of the term "maximum" compared to the way in which the H-I model applies the factor, and the concept of a "ditch-wide" efficiency as opposed to a traditional individual field efficiency. Nonetheless, I have concluded that for the period 1986-94 the percentages utilized by Kansas in its updated version of the H-I model for the various canal systems are the values that should be used.

Mr. Helton acknowledged that his recommended 75 percent for all canals was a "relatively high maximum farm efficiency." RT Vol. 159 at 108-09. In part, he did this to account for the use of tailwater delivered from one canal system into another. *Id.* at 18. For example, tailwater drains from the Fort Lyon system empty into the Amity Canal, becoming part of Amity's supply. RT Vol. 157 at 173-74; RT Vol. 158 at 28-29. Such reuse of tailwater is not accounted for in the H-I model, which Helton saw

as a shortcoming of the model. RT Vol. 159 at 13, 15-16, 107-08. Consequently he thought that use of a 75 percent factor was a way in which such tailwater could be "incorporated into the modeling process," although such tailwater use does not affect irrigation efficiency. RT Vol. 159 at 18, 107-09; RT Vol. 157 at 101. But if this is a modeling deficiency, it should be addressed directly rather than attempting to compensate through the use of another erroneous factor.

It should also be noted that the uniform 75 percent factor is not supported by Colorado's earlier expert witness on this subject. Don Miles varied his estimates of irrigation efficiencies among the various canal systems, and the Kansas factors used in the updated H-I model in each instance equal or exceed Miles' percentages. Colorado, in its new Use Rules, has also adopted a presumptive depletion factor of 75 percent for sprinkler irrigation. That is, it is presumed that only 75 percent of the irrigation water applied by sprinklers is consumptively used by the crop, with 25 percent returning to the river system. Yet there is no doubt that furrow irrigation, which predominates in the Arkansas Valley, is less efficient than using sprinklers and results in greater losses and a lower percentage of use by the crops. RT Vol. 157 at 114, 122.

SECTION VII

SCHROEDER'S MODIFICATIONS TO THE H-I MODEL

In his testimony during the March 1996 segment of the trial, Mr. Schroeder said he thought that he could develop a "more appropriate" version of the H-I model than the competing versions then being used. RT Vol. 152 at 74. And during the spring and early summer of 1996 he set out to do so. The results of his work were presented when the trial reconvened on September 30, 1996.

Mr. Schroeder wanted to address the previous criticisms which Colorado experts had made, particularly the removal of parameters that were not based on physical facts, that is, the so-called restrictive factors. These were the diversion reduction factors, limitations on canal capacities, and the imposition of WANT factors, all of which controlled under certain conditions. Mr. Schroeder had attempted these modifications once before during the liability phase, but the results then were unacceptable even to him. Colo. Exh. 1011, 1012; RT Vol. 139 at 67, 96; RT Vol. 140 at 97.

The new Schroeder version was referred to as "Colorado's August 1996" H-I model. RT Vol. 154 at 22. Not unexpectedly, Mr. Schroeder's modifications removed the diversion reduction factors; set the WANT factors at values consistent with a demand for a full water supply; and adjusted the canal reduction and SEV factors. Colo. Exhs. 1047, 1048. Mr. Schroeder used the Kansas values for maximum farm efficiency, except for the five water short canals which were increased to 75 percent. *Id.*; Colo. Exh. 1046; RT Vol. 154 at 126-27.

The results of the Colorado August 1996 H-I model showed depletions to usable Stateline flow for the period of 1986-94 of 19,700 acre-feet. Colo. Exh. 1047 at 3. By way of comparison, this version of the model calculated depletions to usable flow for the 1950-85 period at only 282,000 acre-feet, although the states had stipulated earlier to 328,505 acre-feet for the 1950-85 period. *Id.*

On cross-examination Mr. Schroeder agreed that he had made a "fundamental change" in the H-I model. RT Vol. 154 at 124. By striking the restrictive factors, his intent was to "represent the priority system as it really exists." *Id.*; RT Vol. 155 at 8. But Kansas said this "changed the whole approach of the model, which is to match diversions" of the Colorado ditches.[12] RT Vol. 154 at 124. Kansas experts testified that the H-I model does not function if the diversion reduction factors are removed. "You end up with overpredicted values [for diversions] and underpredicted streamflows." RT Vol. 151 at 122; RT Vol. 150 at 81-82. Generally, if diversions are overpredicted, Stateline depletions are reduced. RT Vol. 155 at 24-25.

Mr. Schroeder found that the structure of the H-I model did indeed require some limitation on canal capacities. The Amity Canal, for example, had a physical capacity of about 800 cfs, but initially he set the model capacity at 435 cfs. RT Vol. 155 at 55; RT Vol. 154 at 125. In the summer of 1996 he then changed that value to 625 cfs,

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[12] The H-I model predicted diversions rather than inputting actual diversions as fixed data into the model, so that diversions could vary depending upon pumping from wells. Colorado did not object to this methodology. RT Vol. 155 at 8-11.

based upon an engineering report that Amity's maximum diversion between 1939 and 1985 had been in the range of 600 to 650 cfs. RT Vol. 155 at 58. The result of that single change reduced Stateline depletions of usable flow for the 1986-94 period by 4000 acre-feet.[13] *Id*. at 23-24. However, the change caused the model to show diversions which in fact had not occurred historically. *Id*. at 59. The maximum rate of diversion into the Amity Canal, was 435 cfs during 1986-94, and that rate held for only a single day in those nine years. *Id*. at 12, 52-53; RT Vol. 168 at 6. Mr. Schroeder's increase in Amity's canal capacity to 625 cfs left the model less able to match predicted and actual diversions, and in December 1996 he testified that he was "about to do a full circle." RT Vol. 168 at 8. That is, he then believed that the 625 cfs capacity should be reduced back to 435 or 456 cfs. *Id*. at 7-8. At one point he said, "I think without major structural changes, starting over, I don't know that I can improve much on this model." RT Vol. 154 at 144.

The Colorado August 1996 H-I model was seriously in error with respect to predicting diversions for the Amity Canal, which is the largest system between John Martin Reservoir and the Stateline. For the 1986-94 period this version of the model overpredicted the Amity diversions by approximately 340,000 acre-feet, or by 40 percent. RT Vol. 155 at 12-13. In three of the nine years the overprediction was in excess of 60 percent. *Id*. If the model overpredicts diversions, the tendency is to reduce Stateline depletions. RT Vol. 155 at 24-25.

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[13] Colorado's estimated depletions of 19,700 acre-feet for 1986-94 included the 625 cfs capacity for the Amity Canal.

Still, in Mr. Schroeder's final opinion the Colorado August 1996 H-I model was "more reasonable and appropriate" to use than the Kansas March version. RT Vol. 154 at 89, 136. Yet it must be noted that in 1992 Mr. Schroeder also modified the H-I model to remove the restrictive factors, with calibration results that compare favorably with Schroeder's August 1996 version of the model. Colo. Exhs. 1010, 1047; Kan. Exh. 843. His testimony at the time was that the 1992 modified version was not an appropriate or reasonable tool to use. RT Vol. 139 at 67, 96; RT Vol. 154 at 144. In fairness to Mr. Schroeder, however, the 1992 and 1996 versions were not identical, even though the restrictive factors had been removed from both. RT Vol. 154 at 144-45; RT Vol. 155 at 72-74. Moreover, his earlier testimony may have been aimed more at preventing reliance on the model in connection with the Winter Water Storage Program, and the Spronk usable flow analysis. RT Vol. 155 at 65-66.

In Mr. Schroeder's view it was most important to accurately represent the Colorado priority system in the modeling effort. RT Vol. 155 at 21, 67. He believes that the restrictive factors compromise this goal and bias the results with respect to depletions. His changes were driven by the Colorado priority system, even though such changes might not result in a better fit between predicted and observed data. *Id*. at 72. On the other hand, the Kansas expert (Steven Larson) testified that the "most important element" in the modeling process was to try to replicate actual measured data, particularly with respect to streamflows, diversions and reservoir storage. RT Vol. 155 at 91. Mr. Larson said the accuracy of the model in regard to these conditions is an indirect measure of its

ability to calculate depletions. *Id.* at 92. The restrictive factors in the model were not ideal, but were necessary in view of the limitations on available data. RT Vol. 156 at 46. These different approaches marked the essential distinction between the Kansas and Colorado versions of the H-I model, in its latest forms.

In Mr. Larson's opinion, the Kansas March version of the H-I model, using the Colorado pumping figure, gave the "more accurate" results. RT Vol. 155 at 88. I believe the evidence supports this conclusion. Kansas presented a series of exhibits comparing the performances of the Kansas and Colorado versions of the model. Kan. Exhs. 789-799. These comparisons analyzed predicted model results against actual measured values with respect to streamflows, diversions and reservoir storage. They looked at different periods of time, e.g., 1950-85, 1986-94, 1950-94. They examined seasonal accuracy, comparing summer irrigation periods with wintertime data. And they separated the reach of the river system upstream from John Martin Reservoir from the downstream area between the Reservoir and the Stateline.

The statistical analyses included in these exhibits removed certain "outlier" flows from both the predicted and observed totals.[14] Only the three months in 1987 were challenged by Colorado. Flows during this period

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[14] These were months of May and June, 1951; June-September, 1965; April-June, 1985; and April-June, 1987. RT Vol. 155 at 41-42; RT Vol. 156 at 14, 26-27. In its comparative exhibits, Colorado excluded 1951 and 1965 entirely, but did not remove the three high flow months in 1987. RT Vol. 155 at 46-48, 82; RT Vol. 156 at 26.

amounted to 352,000 acre-feet, about 50 percent higher than the highest full year, other than 1987, during the 1986-94 period. RT Vol. 156 at 14-15. Mr. Larson explained that it was important to assess the model's performance within a normal operating range, not at the extremes. Abnormally high flows during 3 months out of 108 months could easily mask the model's real accuracy, whether good or bad. RT Vol. 156 at 117-19.

For the most part, the Kansas March version of the H-I model demonstrated a closer correspondence between predicted and actual conditions than the Colorado August 1996 H-I model. For the full 1950-94 period of time, both models did a similarly good job of predicting monthly Stateline flows. RT Vol. 156 at 9-10. But examining the Colorado results on a seasonal basis, it is evident that the Colorado model consistently underpredicts streamflow in the summer and overpredicts flows in the wintertime. Kan. Exhs. 789, 790 each at page 9. Summer flows were underpredicted on average by 10 percent and winter flows were overpredicted by 34 percent for 1950-94. *Id.*; RT Vol. 155 at 132. The Colorado model also generally underpredicted streamflows in the early years (1950-73), catching up by overpredictions in the later period (1974-94). RT Vol. 155 at 106; Kan. Exh. 792.

Mr. Schroeder's version of the H-I model also overpredicted diversions by the various Colorado canal systems. An inherent tendency in the H-I model toward such overpredictions was exacerbated when Colorado removed the restrictive factors in its August 1966 version of the model. For 1950-94, upstream diversions were

overpredicted by 11 percent, and downstream by 30 percent. Kan. Exh. 789, 790 at pages 11. The result is to reduce Stateline depletions. Mr. Larson acknowledged that the restrictive factors in the model restrain model diversions under certain conditions to amounts less than actual diversions. However, he said at other times model diversions exceed actual amounts. RT Vol. 156 at 41, 45, 101. The goal is to predict total diversions as accurately as possible, and the Kansas version of the model, with restrictive factors in place, clearly does a better job in this respect than the Colorado August 1996 version. Predicting diversions is a "very important component" of the H-I model. RT Vol. 155 at 100. Predicted diversions that are too high cause groundwater return flows to be overestimated, which in turn result in the overprediction of winter streamflows. RT Vol. 156 at 30. The large downstream error is of special concern because of its greater ability to affect Stateline conditions. RT Vol. 155 at 103-04; RT Vol. 156 at 28, 122.

With respect to reservoir storage, the Kansas model again shows a closer correspondence to actual figures than the Colorado version. For 1950-94 Colorado underestimated measured storage in John Martin Reservoir by 19 percent, and by 16 percent for 1980-94. Kan. Exhs. 789, 790 each at page 13. Kansas model predictions for the same periods were a plus 10 percent and 4.5 percent, respectively. *Id*.

A Colorado exhibit comparing predicted with actual average Stateline flows for the 1986-94 period showed the Colorado August 1996 H-I model surpassing the Kansas version. According to this exhibit, Colorado's predicted flows were only one percent under observed flows, while

Kansas was off by a minus eight percent. Colo. Exh. 1047, Tables 2 and 4; Colo. Exh. 1049. However, in this comparison, Colorado included the three high flow months in 1987. If these three months are removed from the statistical analysis, as I believe they should be, then the Colorado model overpredicts by 9 percent while the Kansas version still underpredicts, but by a smaller amount, that is, by 5 percent. Kan. Exhs. 789, 790 each at page 9. Even without the removal of the three high flow months, the Kansas model is more accurate in predicting Stateline flows in six of the nine years during the 1986-94 period. RT Vol. 155 at 27, 33.

SECTION VIII

STATELINE DEPLETIONS FOR THE PERIOD OF 1986-94

Depletions for the time period considered during the liability phase of the trial, i.e., 1950-85, were agreed to by stipulation. These depletions amount to 328,505 acre-feet. For the period of 1986-94, however, depletions to usable Stateline flow were vigorously contested. The amounts of claimed depletions were calculated variously at 98,637 acre-feet, 91,565 acre-feet, 30,700 acre-feet, and finally at 19,700 acre-feet. The highest amount was based on Kansas' initial estimate of the pumping in Colorado, but was revised downward to 91,565 when Colorado's pumping estimates were accepted. The amount of 30,700 acre-feet was Colorado's estimate based on the "Colorado updated H-I model," which differs significantly from the Kansas version only in that it does not include Kansas' new maximum farm irrigation efficiency factors or changes to John Martin Reservoir operations. The lowest amount of depletions was based on the Colorado August 1996 (Schroeder) version of the H-I model.

Once the pumping figures were agreed upon, the amount of depletions for 1986-94 turned largely on the maximum irrigation efficiency factors, and the question of whether to rely upon the Kansas March version of the H-I model, using Colorado's pumping figures, or upon the Colorado August 1996 version. For the reasons stated in the earlier sections of this Report, I have concluded that the evidence supports the use of the Kansas model. On that basis, I recommend that depletions of usable Stateline flow for the 1986-94 period be determined to be 91,565 acre-feet.

SECTION IX

COLORADO'S COMPLIANCE ACTIVITIES

Bringing Colorado into current compliance with its compact obligations has been a major focus at each of the trial segments since the Court's May 15, 1995 Opinion on liability. Initially, I denied Kansas' motion to enjoin the State of Colorado from pumping more than 15,000 acre-feet annually [i.e., the amount of allowable precompact pumping]. The reasons for denial are set forth in Exhibit 3 in the Appendix. However, I ordered Colorado on August 11, 1995 to prepare a detailed report on the actions "being taken by and within Colorado to comply with the Arkansas River Compact," and to provide that report to Kansas by September 29, 1995.

The report required by this order became Colorado Exhibit 1018. The State Engineer then updated Colorado's efforts by an Addendum No. 1 dated February 23, 1996 (Colo. Exh. 1019) and Addendum No. 2 dated July 12, 1996 (Colo. Exh. 1051). These reports, and the extensive testimony of the Colorado State Engineer and others, show a most impressive record in beginning to control postcompact pumping. Kansas has certain concerns about whether the program will, in fact, prevent further Stateline depletions, and points to a number of claimed shortcomings. These are discussed in Sections X and XI. Nonetheless, given the ineffectual and frustrating history of Colorado's previous efforts to regulate wells, the State's current progress is quite remarkable.

Colorado's compliance program is built around two sets of rules promulgated by the State Engineer in accordance with the State's administrative procedures, and

ultimately approved by the Courts. These are the "Measurement Rules," adopted in 1994, and the "Use Rules" which were published in September 1995, and ordered by Judge John E. Anderson, III, the water judge for Water Division 2, to become effective on June 1, 1996. Colo. Exh. 1018, Appendix B; Colo. Exh. 1051 at 4. These rules, and the Kansas views concerning them, are fully discussed in Sections X and XI. However, the essence of the Use Rules is to completely prohibit postcompact pumping (with the exception of the 15,000 acre-foot precompact allowance) unless replacement water is provided to offset depletions of usable Stateline flow.

Beyond the adoption of these Rules, the State Engineer has also concentrated on obtaining better well data. One of the major issues in the liability phase of the trial concerned the number and location of irrigation wells in Colorado, and the amounts of water pumped. Most of the wells were constructed at a time when no prior state permit was required, and until 1994 no general state system existed for the reporting of well pumping. In 1994 the State Engineer set about to remedy the situation. This was after my draft report on liability had been issued [February, 1994] but well before the report was confirmed by the Supreme Court in May of 1995. The State Engineer began a field inventory of all wells covered by the Measurement Rules, that is, all wells included in the area modeled during the liability phase of the trial,[15] together

[15] This includes irrigation wells in the valley-fill and surficial aquifers, from Pueblo to the Stateline, with a capacity of 50 gpm or more. In its Water Budget, Colorado had originally included only wells having a capacity of 100 gpm or more, although Kansas used a threshold of 50 gpm.

with certain additional areas. The field inventory was essentially complete by early 1996, and the field information has been entered into a computer database. Colo. Exhs. 1018 at 8-10, and 1051 at 7. Each well has been assigned a structure identification number with a metal tag affixed to the well as a permanent marker. Data obtained include information on ownership, location, power source and account numbers for each well. The database now covers approximately 2551 wells along the Arkansas River between Pueblo and the Stateline. Colo. Exh. 1051 at 7. All of these data have been made available to Kansas.

The legislature has steadily added funds to implement the State Engineer's enforcement program. In 1993-94 he received budgetary authority for 3.5 additional full time employees, and the number was increased each year to 17.50 for 1996-97. Colo. Exh. 1019 at 4. All authorized personnel have been hired, and Mr. Simpson believes that he has sufficient resources to administer and enforce the compliance program. Colo. Exh. 1051 at 15; RT Vol. 146 at 95. The legislature has also authorized the Colorado Water Conservation Board to loan up to $3,750,000 for the purchase of replacement water and water rights, and another $50,000 has been made available to enhance the system for the electronic transfer of power data. Colo. Exh. 1051 at 2, 15.

Most well owners are now represented by one of three large associations. These associations have undertaken the responsibility for the preparation of augmentation plans, and the acquisition of replacement water and water rights. These organizations are: the Colorado Water Protective & Development Association ("CWPDA" or the "Brotherhood"); the Arkansas Groundwater Users Association ("AGUA"); and the Lower Arkansas Water Management Association ("LAWMA"). Colo. Exh. 1058. The latter organization includes wells located between John Martin and the Stateline, while the other two represent owners primarily between Pueblo and John Martin Reservoir. RT Vol. 147 at 16-18.

It appears, at least in the near term, that sufficient replacement water is available to offset Stateline depletions of usable flow. LAWMA is beginning the purchase of the XY Canal and the dry-up of its lands. LAWMA has also acquired shares in other canals, and is looking to the purchase of the Manvel Canal. RT Vol. 147 at 16-17, 32. Between 33,000 and 43,000 acre-feet of excess transmountain water are expected to be available from the cities of Colorado Springs and Pueblo for the next 20 years or so. RT Vol. 148 at 65-66. This is not new water to the Arkansas River Basin, but rather water that can be transferred away from irrigation in Colorado and used toward replacement obligations to offset Stateline depletions. *Id.* The current price of replacement water appears to be $8 to $10 per acre-foot. RT Vol. 147 at 96; RT Vol. 147 at 32.

It is evident that the State Engineer now has broad support from the Colorado water users, unlike their reaction to his efforts in the 1960s and 1970s to regulate well pumping. *Fellhauer v. People*, 447 P.2d 986 (Colo. 1968),

Matter of the Arkansas River, 581 P.2d 293 (Colo. 1978). The 1994 Measurement Rules were adopted essentially without opposition, and while the 1996 Use Rules were protested by a few users requiring an eight-day trial, widespread support for the rules came from the canal companies and various user groups. Colo. Exh. 1051, Appendix A.

I believe that Colorado as a state fully comprehends the seriousness of its obligations. In response to a comment from me that the State Legislature should be aware that scarcity of funds would not be an excuse for noncompliance with the compact, Mr. Simpson replied:

> "What I discussed [with the Legislature] was exactly what you said, if the resources weren't made available, an order of the United States Supreme Court would certainly bring that about, and they understood that." RT Vol. 146 at 97.

Certainly the Colorado representatives in the courtroom recognize the demand for prompt compliance.

SECTION X

1994 MEASUREMENT RULES

On March 29, 1994 the Colorado State Engineer adopted Rules and Regulations Governing the Measurement of Tributary Ground Water Diversions Located in the Arkansas River Basin ("Measurement Rules"). These Rules became effective July 15, 1994, after approval by the District Court Water Division 2, in Case No. 94CW12. Colo. Exh. 1018. With limited exceptions, these Rules apply to all wells located in the Arkansas River Basin, not only to irrigation wells. RT Vol. 161 at 35; Colo. Exh. 1052. All such wells are required to install a totalizing flow meter or have a power conversion coefficient ("PCC") determined.[16] The accuracy of meters and the power conversion coefficients must be reverified at least every four years. Annual reports of the amounts of water pumped each month are required, unless a well is certified to be inactive. By July 1996 some 2131 wells within the model domain of this case were in compliance with the Measurement Rules. Of this number, totalizing flow meters had been installed on 185 wells, power conversion coefficients had been determined for 1141 wells, and affidavits of inactive status had been filed for 805 wells for the year 1996. Colo. Exh. 1051 at 8.

Based on the experience gained during one and a half years of operation under the Rules, including a 1995 random field test of the power conversion coefficients for 54 wells, the Colorado State Engineer on February 28,

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[16] The power conversion coefficient, or PCC, is the number of kilowatt hours required to pump one acre-foot of water.

1996 filed certain proposed amendments to the Measurement Rules. These were approved by the Water Court and became effective on June 1, 1996. Colo. Exh. 1019 at 12; Colo. Exh. 1051 at 4-6. The principal changes in the Rules require test measuring equipment to be accurate within plus or minus 2%, replacing the previous 5% standard; require that the standards for power coefficient testing include the pumping drawdown and operating pressure at the time the test is conducted; require a new rating of power coefficients whenever a new or reworked pump and/or motor is installed, or other alterations are made, which would affect the power coefficient; and require the installation of flow meters on compound or certain complex systems, which must be accurate within plus or minus 5% of an independent field measurement using calibrated equipment. Colo. Exh. 1051 at 5-6; RT Vol. 161 at 53-54. Accompanying these changes, the state legislature also enacted SB 96-124 requiring power companies to transmit directly to the State Engineer the records of energy used to pump groundwater. Colo. Exh. 1051 at 3.

A. Measurement by Use of Meters or by the PCC Method.

Colorado has allowed most well owners the option of using either meters or the PCC method to measure and report the amounts of water pumped, although meters are mandatory for non-electric wells (i.e., pumps driven by natural gas, diesel or gasoline) and for wells that are part of a complex or compound system. Colo. Exh. 1051, App. B at 3; RT Vol. 149 at 119. Non-electric wells comprise about 3 percent of the total. RT Vol. 160 at 104. Most

users have chosen the PCC method since it is much less expensive. The cost of installing a meter for a large capacity well was estimated between $500 and $2000, although Kansas' State Engineer acknowledged that one would be "very lucky" to get by for less than $1000. RT Vol. 163 at 42; RT Vol. 149 at 120.

It is the Kansas view that metering is the most accurate way to measure pumping, and that it would be feasible to install a mandatory metering system along the Arkansas River in Colorado. RT Vol. 163 at 66, 75; RT Vol. 162 at 106, 114. It is generally agreed that properly installed and maintained meters have an accuracy rating of plus or minus 5 percent, which to Kansas is an acceptable range. RT Vol. 148 at 6; RT Vol. 162 at 107; RT Vol. 163 at 63, 66. Both states agree that the accuracy of pumping data is important. However, Kansas has remained just short of insisting that Colorado require the installation of flow meters on all wells. RT Vol. 148 at 22; RT Vol. 161 at 57; RT Vol. 163 at 166-67. But neither has Kansas been prepared to accept Colorado's PCC measuring program. Kansas experts testified that the Measurement Rules, as implemented, do not provide the level of accuracy and reliability necessary to determine Stateline depletions. RT Vol. 162 at 106-07; RT Vol. 163 at 11; RT Vol. 161 at 57.

Kansas has reason to be concerned about the accuracy of the PCC readings on an individual well by well basis. A random test of 54 wells in the late summer of 1995 was designed to confirm the accuracy of the PCC values previously submitted by the well owners. A number of problems were uncovered resulting in the February 1996 amendments to the Measurement Rules.

Another test program was then conducted in the spring of 1996 on 64 wells, again to check a measured PCC value against the data in the state files. Of these wells, 26 of the power consumption coefficients measured in the field were within 10 percent of the values previously submitted, and 26 of the comparisons were within an envelope of plus or minus 25 percent. Kan. Exh. 852. The remaining 18 wells involved greater variation, but for specific reasons. *Id.* Mr. Schroeder reported that none of these tests had recorded the discharge pressures, and pumping levels were recorded for less than half of the wells. *Id.* The amended rules now require both. The power conversion coefficient for a well depends upon the depth to water and the discharge pressure of the pump, shorthanded as the total dynamic head. RT Vol. 148 at 12; RT Vol. 149 at 116. For example, the discharge pressure is greater if water is pumped into a closed sprinkler system than if water is discharged into an open furrow system; more electricity may thus be required to produce the same amount of water.

While Colorado's State Engineer Hal Simpson believes in the PCC methodology, he too was dissatisfied with these preliminary test results, although he testified that true comparisons were difficult because of the lack of total dynamic head. RT Vol. 161 at 51. In the summer of 1996, therefore, he invited Kansas to join with Colorado in the design of a pump testing program. Because of Mr. Spronk's death, however, Kansas was unable to respond. RT Vol. 161 at 50-51. Mr. Simpson renewed the offer during the trial, and Mr. Pope, the State Engineer of Kansas, in his turn on the witness stand said they would

be "very interested and very willing to participate." Rt Vol. 149 at 43; RT Vol. 161 at 59; RT Vol. 162 at 110-111.

The reliability of the PCC method to determine Colorado's pumping will be an ongoing subject in future trial segments. RT Vol. 163 at 67-68. It is clear, however, that future tests must demonstrate much improvement in the accuracy of this system of measurement.

B. Measurement Considerations

Totalizing flow meters are required in several other western states. Kansas, for example, has required the installation of meters on more than 15,000 wells. RT Vol. 162 at 97. New Mexico also requires meters in the area affected by its obligation to Texas under the Pecos River Compact. Kan. Exh. 806; RT Vol. 162 at 117-18; RT Vol. 163 at 171. Nebraska also has a "strong metering program" in some areas. Rt Vol. 162 at 116. However, the reliability of metered results first requires inspection to assure proper installation of the meter, and then an "intensive program of operation, maintenance, repair and follow-up calibration." RT Vol. 162 at 79; RT Vol. 163 at 11-12. In Nebraska, it is the servicing of the meter by the state that has been the "key to success." RT Vol. 162 at 116.

Most metering programs call for annual reports, on a self-reporting basis. RT Vol. 162 at 75-77, 105. However, Kansas here seeks compliance on a "real time" basis, that is, as close as possible on a monthly basis. Rt Vol. 163 at 68, 102; RT Vol. 167 at 66. There was no evidence on the feasibility of trying to read meters monthly, if meters were to be required, over the 150 miles or so of the Arkansas River that is involved in this case. Mr. Pope

testified that a system which permitted Colorado well owners merely to self-report pumping data would not be acceptable to Kansas. RT Vol. 163 at 13.

There is also a question of how necessary it is to have well-by-well accuracy in view of the way pumping data is used in the H-I model. The model aggregates all of the pumping within a user area or ditch system. RT Vol. 163 at 69, 72; RT Vol. 164 at 37-38, 40. The *distribution* of that pumping is then estimated. RT Vol. 164 at 40. Thus, pumping data from one well may be high, while another is low. Yet the average of the two might be "right on the button" for purposes of model calculations. *Id.* However, as Kansas notes, the presumptive depletion factors under the Use Rules [See Section XI] are 30 percent for supplemental wells, 50 percent for single source wells, and 75 percent for sprinkler systems, so that the results of pumping an acre-foot of water can be quite different. Additional evidence may be required on this point.

In Mr. Simpson's opinion the Measurement Rules, as amended, will provide data that is "reasonably accurate" and "sufficient" for the purposes of administering the Arkansas River. RT Vol. 148 at 17; RT Vol. 161 at 48. Indeed, he believes that the PCC method is "still the most appropriate way to proceed." RT Vol. 161 at 49. He sees the data improving. RT Vol. 149 at 42. The three larger associations are now using very competent consulting engineers to perform the PCC tests, and 25 percent of the wells will be checked each year. RT Vol. 149 at 42, 49, 55. And the power data are now being electronically transmitted directly to the state by the power companies on a

monthly basis. Simpson expects that the system, if properly administered, should provide results that are accurate within 5 or 10 percent. RT Vol. 148 at 16.

It is true that a power conversion coefficient will change over an irrigation season as groundwater levels drop. But the aquifer in the Arkansas Valley is not declining constantly; it recovers at the end of each year. RT Vol. 161 at 56. Mr. Simpson understood that the majority of tests are done earlier in the season when water levels are higher. If this is true, and if well levels decline later, the PCC results would be conservative. RT Vol. 149 at 109, 111; RT Vol. 147 at 6. That is, the data would tend to overestimate the volume of water pumped because more power would be required to lift the water from greater depths even though the quantity of water produced was the same.

A major advantage of the PCC program is timely data. RT Vol. 148 at 19. The system can be used to estimate pumping during the irrigation season, and to compare that data with the assumptions in the replacement plans. The state can determine if wells claimed to be inactive are in fact being pumped. RT Vol. 149 at 42. The system also has widespread user acceptance, the importance of which should not be taken lightly where prompt compact compliance is being sought. RT Vol. 149 at 42. Farmers are notoriously opposed to meters, and historically in Colorado farmers have not been reluctant to take their complaints to the courts or to the legislature. Of course, it can be argued that the pumpers have accepted the Measurement Rules only because the PCC methodology is their least costly alternative, and they are not necessarily concerned about the accuracy of the results.

But it should be remembered that the Measurement and Use Rules protect not only Kansas, but also the holders of senior surface rights in Colorado. In any event, sufficient accuracy in pumping estimates in order to determine compact compliance will be required, whatever measurement system may finally be used.

C. Conclusions.

Measuring indirectly the amount of water pumped through power usage is a well accepted technique, so long as the required data is accurate. It requires data on the amount of electricity supplied to any particular well, and a field test of the pumping facility to determine quantity of water produced per unit of electricity, known as the power conversion coefficient or PCC. Indeed, this was the methodology used by both states to estimate pumping from 1950 through 1985, although much of the early data, while the best that could be developed, were quite crude. Early power records were missing and had to be estimated through certain mathematical techniques. And the PCC values used throughout the entire liability phase were developed by the USGS during a single study in 1964-68. Jt. Exh. 66.

There is no question that the current Measurement Rules, together with Colorado's improved well database and recent legislation, vastly improve the ability of both states to calculate total pumping. Power data can now be reliably transmitted directly to the Colorado State Engineer on a monthly basis, and these data are available to Kansas. The PCC values, however, remain the critical part of the methodology. Colorado indicates that we may

expect continued improvement in the accuracy of these coefficients, and possibly that will be the result of any testing program developed jointly by Colorado and Kansas, or otherwise. It should be noted that the Kansas Chief Engineer was careful to remind the Court that he had never said that "the PCC method would be unacceptable." RT Vol. 163 at 66. Although it was the Kansas position that a representative sample of 10 percent of the wells should be equipped with meters, and that more than one water level measurement during the irrigation season should be required for all wells. Kan. Exh. 809 at 4-5; Kan. Exh. 810 at 5. The issue is whether the methodology will prove sufficiently accurate for purposes of compliance with the compact, and that question remains open.

However, at the present time, I find no reason to recommend changes in the Measurement Rules.

SECTION XI

1996 USE RULES

The Amended Rules and Regulations Governing the Diversion and Use of Tributary Ground Water in the Arkansas River Basin ("Use Rules") were promulgated by Colorado's State Engineer in September of 1995, and became effective on June 1, 1996 after protest, trial, and approval by the Water Court. Colo. Exh. 1051, Appendix A. The Use Rules are set forth in Colorado Exhibit 1018, Appendix C.

The "Compact Rule" is Rule 3. This Rule provides that all diversions of groundwater for irrigation use, from the valley-fill and surficial aquifers along the Arkansas River from Pueblo to the Stateline, "shall be totally discontinued" unless depletions to usable Stateline flow caused by such pumping are replaced pursuant to a plan approved by the Colorado State Engineer's office. The only exceptions are the precompact wells, which are allowed to pump 15,000 acre-feet annually in accordance with my Report on the liability phase of the trial. Even these wells, however, are still subject to Rule 4 which requires that replacement water be provided in order to protect senior surface water rights in Colorado against depletions. Rule 3.3; RT Vol. 146 at 51. The result is that precompact wells must also be included in an approved augmentation plan.

Depletions to usable Stateline flow are to be determined through the use of the H-I model, and the Durbin usable flow method with the Larson coefficients, "or such other method approved by the Special Master . . . " Rule 3.4. Adoption of the Kansas model reflects Colorado's

decision announced at the first court session following the Supreme Court's decision on the liability phase. RT Vol. 146 at 52, 62. At this point in time, I see no reason why the H-I model should not be utilized, although new data input will be required at least yearly, and other modifications will be needed to incorporate the augmentation plans. RT Vol. 164 at 149, 151; RT Vol. 147 at 34.

Rule 4 responds directly only to the protection of senior surface water rights in Colorado, although Mr. Simpson believes that implementation of Rule 4 will also "protect the depletions to state line flow." RT Vol. 147 at 127. It has the "derivative effect" of benefitting Kansas. *Id.* at 130. However, if this is not true, Rule 4.1 still provides that replacement water supplied to protect Colorado senior rights "shall not relieve a well user of an obligation to replace depletions to usable Stateline flow." Rule 4.1; RT Vol. 146 at 61.

The Rules establish certain "presumptive stream depletions" which are used to determine depletions to the Arkansas River caused by well pumping. For wells that provide a supplemental supply for flood and furrow irrigation, 30 percent of the amount pumped is presumed to be the depletion to the stream. Rule 4.2(a). For wells that are the sole source of supply for flood and furrow irrigation, the percentage is 50. Rule 4.2(b). And for wells that are the sole source of supply for sprinkler irrigation systems, the presumptive stream depletion is 75 percent of the amount pumped. Rule 4.2(c). Colorado tested some different percentages. For example, 40 percent instead of 30 percent for supplemental wells was tried in the H-I model. However, Mr. Simpson testified that 30 percent was selected because it "worked," that is, the model

showed that this figure protected against depletions of usable Stateline flow. RT 147 at 41-42. Kansas' expert did not contest the 30 and 75 percent figures, but thought the 50 percent figure for sole source wells was low. RT Vol. 166 at 131. The presumptive stream depletions are to be reviewed annually, and revised if necessary to prevent material injury to senior surface rights in Colorado, and depletions to usable Stateline flows. Rule 4.3.

Implementation of the Rules begins with an estimate of pumping for the following year prepared by and within each augmentation association. Using the presumptive stream depletions, the amount of required replacement water can be calculated. RT Vol. 164 at 136. An augmentation plan for replacement water is then prepared and submitted to the State Engineer for approval. Rule 6. Unit response factors are developed by the State Engineer to determine the timing and location of stream depletions. Rule 8. A separate accounting model also utilizes monthly pumping data and power consumption data obtained electronically from the electric utilities to compute monthly diversions of groundwater. Using the unit response factors, the accounting model provides the State and the augmentation associations with the amount and location of stream depletions on a monthly basis. Colo. Exh. 1018 at 27-28. These data will allow the State Engineer's office to determine whether adequate replacement water has been provided. *Id.* The H-I model will then be used in an "after-the-fact mode" to determine how well the state did in fact perform. RT Vol. 147 at 49.

In Mr. Simpson's judgment, Colorado will be in compliance with the compact in 1996. "There should be no

depletions to usable state line flow in 1996." RT Vol. 160 at 172, 174.[17]

A. Replacement Plans.

A summary of 16 replacement plans approved as of September 24, 1996 can be found in Colorado Exhibit 1058. More detailed descriptions of the plans, and their approvals by the Colorado State Engineer, appear in Colorado Exhibit 1051, Appendix C. The plans give the number of wells that are subject to the Use Rules; estimated total pumping; the out-of-priority depletions to senior surface water rights in Colorado that must be replaced; the additional amounts required to be delivered to the Stateline in order to replace depletions to usable Stateline flows; the specific sources of replacement water; and any conditions imposed by the State Engineer. The plans were forwarded to Kansas as they were submitted, beginning in early May of 1996. RT Vol. 166 at 107.

A total of 1598 active wells are included in the plans. Colo. Exh. 1058. Estimated pumping for 1996 totals 161,109 acre-feet. *Id.*[18] The amount of replacement water

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[17] Even though only 60 percent of out-of-priority depletions in Colorado had to be replaced in the first partial year of operation, Mr. Simpson thought that actual pumping would be less than the amounts estimated in the replacement plans. Moreover, there were high deliveries of transmountain water, leaving about 8,000 acre-feet of unallocated return flows. These factors provided a "cushion" during the first year of implementation. RT Vol. 160 at 171-72.

[18] Kansas evidence put the total at 165,000 acre-feet. Kan. Exh. 808 at 9. Pumping during 1975-94 averaged 175,315 acre-

required for senior Colorado ditches is 17,160 acre-feet, and 7953 acre-feet of additional replacement water is required at the Stateline. *Id.* For 1966 only, the Use Rules provide that only 60 percent of the out-of-priority depletions to senior surface water rights in Colorado must be made up. After April 1, 1997 full replacement is required. Colo. Exh. 1018, Appendix C, Rule 11. Kansas expert Dale Book estimated that meeting the full requirements for both Colorado and Kansas users will require between 40,000 and 50,000 acre-feet annually of replacement water. RT Vol. 164 at 145; RT Vol. 166 at 120. This estimate assumes a continuation of the same general level of pumping. Kansas expressed some concern about the availability of replacement water in dry years and on a long-term basis, although there was no dispute over current availability. RT Vol. 166 at 127-28; Kan Exh. 808 at 6. However, if replacement water were not to be available in sufficient quantities, the Use Rules are unequivocal that pumping must be curtailed.

Because only 60 percent of the depletions to senior surface water rights in Colorado were required to be replaced in 1966, additional replacement water was required for compact compliance at the Stateline. In determining the amounts of this additional replacement, Colorado used a factor of 10 percent of the unreplaced pumping upstream of John Martin Reservoir and 10.75 percent below. RT Vol. 166 at 111. That is, along with the replacement water required for Colorado users, the extra percentage of replacement water was intended to bring

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feet per year, although the average was only 154,995 for 1991-94. Kan. Exh. 808, Table 2.

Stateline flows into compact compliance. RT Vol. 166 at 113. The factors of 10 percent and 10.75 percent were derived from the 1992 version of the H-I model. RT Vol. 166 at 114. This was the version then available to the Colorado State Engineer, and is the version that had been recently used to determine the stipulated depletions for 1950-85. RT Vol. 162 at 68; RT Vol. 167 at 118. Nonetheless, Kansas experts testified that the 10 percent factors underestimate Stateline depletions on a long-term basis. Kan. Exh. 808 at 12. Using the Kansas June 1996 version of the H-I model, which includes current pumping for 1980-94, the 10 percent value would be 12.2 percent, and the 10.75 value would be 17.9 percent. RT Vol. 166 at 134; Kan. Exh. 804. If my recommendations in Sections V, VI and VIII concerning the H-I model are approved, the 10 percent factors used by Colorado will apparently require modification in the future in order to assure compact compliance.

B. The LAWMA Replacement Plan.

The Lower Arkansas Water Management Association ("LAWMA") is the largest of the well owner groups. The LAWMA replacement plan covers the entire area downstream from John Martin Reservoir to the Stateline (about 58 miles), and includes some 637 wells. Kan. Exh. 808 at 15. Its pumping estimate of 92,689 acre-feet is about twice the amount of the next largest plan. Kan. Exh. 808, Table 1; RT Vol. 167 at 9. The LAWMA pumping estimate was based on the 1991-95 annual average of wells included in the plan. Kan. Exh. 826 at 1.

In the reach of the stream upstream from John Martin Reservoir, the amounts of replacement water required to offset depletions to senior surface water rights in Colorado also provide substantial benefit at the Stateline. Indeed, Kansas' expert Book acknowledged that the Use Rules for upstream wells, considering only those wells, will probably "prevent depletions to usable state line flow." RT Vol. 167 at 76. However, downstream of John Martin Reservoir, the LAWMA wells are assumed to have no obligation to Colorado surface rights during the wintertime; hence, the LAWMA plan does not replace winter depletions. RT Vol. 164 at 139. Moreover, a significant amount of pumping occurs downstream of the headgate on the Buffalo Canal which does not affect any Colorado surface rights. *Id.*; Kan. Exh. 826 at 3. The Colorado State Engineer has always recognized that "some special additional requirements" would be needed in the area below John Martin Reservoir. RT Vol. 146 at 63. Nonetheless, the amount of replacement water under the LAWMA plan is only 13 percent of total postcompact pumping. Kan. Exh. 808, Table 1; RT Vol. 166 at 116. In contrast, the amounts of replacement water provided under the two large upstream plans (CWPDA and AGUA) equal 21 and 28 percent, respectively, of their postcompact pumping. *Id.* The pumping below the Buffalo Canal headgate, which is the area most likely to affect Kansas directly, was estimated at 39,598 acre-feet. Kan. Exh. 826, Attachment 5. Depletions from this amount of pumping were calculated by Kansas at 12,707 acre-feet, or about 30 percent of such

unreplaced pumping. RT Vol. 167 at 154-56. This 30 percent figure is comparable to the 10.75 percent presumptive depletion figure that Colorado used downstream of John Martin Reservoir. *Id.* at 156.

Kansas was also concerned that the LAWMA plan did not include an annual maximum amount of pumping, and allowed any replacement (figured on the basis of the average pumping during 1991-95) to be made up in the following five years. RT Vol. 167 at 10-11; Kan. Exh. 826 at 15. This degree of latitude was not allowed in any of the other replacement plans, and I expect will not be found in LAWMA's next plan which must be submitted for the year beginning March 1997. RT Vol. 167 at 14.

C. Real Time Compliance.

The Arkansas River Compact provides that Stateline flows shall not be materially depleted in either usable quantity or "availability for use." Article IV-D. Based upon this provision, Kansas introduced much evidence on the timing of replacement flows. Kansas experts spoke of "real time" compliance, which to them generally meant compliance on a monthly basis. Kan. Exh. 809 at 8-9; RT Vol. 163 at 102; RT Vol. 167 at 66. That is, Kansas wanted a reasonable amount of replacement each month rather than "slugging the water to Kansas in a couple of months early or late." RT Vol. 167 at 117. Colorado actually began releasing replacement water to the river in April 1996. RT Vol. 167 at 82. Apparently there was little or no coordination between the states on this first delivery, but on subsequent releases Kansas did acknowledge "notice" and "communication." *Id.* Still Kansas was of the view

that deliveries were made when they were most convenient and efficient for Colorado but not necessarily for Kansas. Kan. Exh. 808 at 5.

It was apparent, however, that even if depletions were made up on a monthly basis, the additional water would not be assured of matching the need in Kansas. Mr. Franzoy testified extensively about the timing of water applications on crop yields. Kan. Exh. 810; RT Vol. 164 at 93. The timely need for irrigation water, and its optimum use, varies widely with the type of crop, its stage of growth, the type of soil, and the climatic conditions. However, there is generally a "window" of 4-6 days, allowing 2-3 days on either side of the optimum time, in which irrigation water should be applied. Kan. Exh. 810 at 1, 3. Timing is critical at each stage of crop development during the growing season. Shortages at one point in the crop growth cycle generally cannot be offset by large deliveries later without significant yield reduction. *Id.* at 3; RT Vol. 164 at 105. The farmers are the people "who best know when water is needed for their crops." RT Vol. 164 at 107. And Mr. Franzoy concluded that it would be a "big benefit" if there were a system in place where replacement water would be delivered on their call. *Id.*

Actually, the notion of establishing an account in John Martin Reservoir for replacement water that would be under the control of Kansas was discussed throughout this segment of the trial. Such an account was favored by both states, but the issues were more complex than might initially appear, and no agreement could be reached during these trial proceedings. Fortunately, action by the

Arkansas River Compact Administration, and a stipulation between the states reached on March 17, 1997, avoided the issue of whether such an account could, or should, be ordered.

The Offset Account in John Martin Reservoir was established by a Resolution of the Arkansas River Compact Administration (Jt. Exh. 180) and by Stipulation of the states, approved by me on April 3, 1997. Both of these documents are included as Exhibit 9 in the Appendix. The Offset Account was also approved by the Chief of Engineers of the Corps of Engineers. The Account allows Colorado to deliver replacement water into John Martin Reservoir for the purpose of offsetting depletions to usable Stateline flows; to receive credit (less transit losses) for delivery of such water at the Stateline; and for the water to be released at the demand of Kansas. While the actual operation of the Stipulation needs to be monitored, it appears that the issue of the timing of replacement water deliveries has been resolved for the present. Some caution needs to be noted since the Offset Account can be cancelled annually by either state.

D. Conclusion.

The key to compact compliance rests not so much with the Use Rules themselves as with the Replacement Plans and their implementation. 1996 was a phase-in year since the Rules were not effective until June 1, 1996, after approval by the Colorado Water Court. The data to assess the operation of the Plans during 1996 will not be available until the spring of 1997, and will then be the subject of a future trial segment during this remedies phase. The

Replacement Plans prepared and approved for 1997 will undoubtedly reflect the experience gained in the 1996 partial year, and will provide the first complete year to examine for compact compliance.

SECTION XII

THE FORM OF REMEDY FOR VIOLATION OF THE COMPACT

In *Texas v. New Mexico*, 482 U.S. 124, 96 L.Ed.2d 105, 107 S.Ct. 2279 (1987), the Court ruled that the interstate compact on the Pecos River did not prevent ordering a suitable remedy, "whether in water or money." 482 U.S. at 130. The Special Master in that case had believed himself to be constrained by the terms of the compact, and therefore had recommended that a shortfall of 340,100 acre-feet be made up over ten years by additional water deliveries, rather than by awarding monetary damages. The Court found, however, that the lack of a specific compact provision for a remedy in case of breach did not "mandate repayment in water and preclude damages." 482 U.S. at 130.

The Arkansas River Compact is similar to the Pecos River Compact involved in *Texas v. New Mexico* in that neither compact deals with remedies for a breach. I conclude, therefore, that *Texas v. New Mexico* is controlling here, and that a suitable remedy may be in terms of money damages or in water. Evidence on this issue has not yet been taken but will be required. Making up depletions by delivering more water has "all the earmarks of specific performance, an equitable remedy that requires some attention to the relative benefits and burdens that the parties may enjoy or suffer." *Texas v. New Mexico*, 482 U.S. at 131. Likewise, a remedy in money, rather than water, requires a showing that it would be "equitable or feasible." *Id.*

Pursuant to an earlier order, Kansas has filed a statement that it seeks a remedy for past violations of the Arkansas River Compact "in the form of money only." Kan. Brief re Statement of Position at 1. Colorado, on the other hand, takes the position that repayment of past depletions in water rather than money "would likely be a more equitable remedy in this case." Colo. Response at 2. The Court in *Texas v. New Mexico* remanded the case to the Special Master for his recommendation as to whether New Mexico "should be allowed to elect a monetary remedy and, if so, to suggest the size of the payment . . . " 482 U.S. at 132. Kansas puts emphasis on the word "elect" to argue that Colorado has the burden to overcome Kansas' choice; that is, that Colorado must convince the Court that it would be equitable and feasible "to reject the remedy elected by the plaintiff state."[19] Kan. Brief re Statement of Position at 2. Kansas also cites *Barrow Development Co. v. Fulton Insurance Co.*, 418 F.2d 316 (9th Cir. 1969) for the common law rule that the election of the remedy is the prerogative of the plaintiff. I disagree with Kansas' position.

In *Texas v. New Mexico*, monetary damages had been taken off the table by the Special Master's conclusion that such a remedy was not available. This view was of no consequence to the plaintiff, Texas, because it had always sought repayment in water, not money. I read the Court's decision as merely allowing the defendant New Mexico to

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[19] In its Reply Brief, Kansas seems to soften its position, stating that the essential question is whether the Court "should" reject the request of a plaintiff state for monetary damages in a compact enforcement case. Kan. Reply Brief at 4.

be heard on its choice, once an alternative remedy became possible. When considering Kansas' argument, it also should be noted that the election did not go to the plaintiff state, which Kansas contends should be the rule, but rather to the defendant state, New Mexico.

Nor does the *Barrow* case support Kansas. The election of remedies referred to in that case involved a choice between contract or tort in filing the original complaint. It had nothing to do with the form of relief if the plaintiff were to prevail – which presumably would have been money damages under either cause of action. The question addressed in the case was whether the plaintiff, having started in contract, could switch its action to one in tort, or whether it was bound by its initial election.

Briefs have been filed on three other issues affecting damages, and these questions are discussed in the next sections of this Report.

SECTION XIII

THE MEASURE OF DAMAGES – COLORADO GAIN OR KANSAS LOSS

In the event that the remedy for past depletions of usable Stateline flow should be in the form of monetary damages, Kansas contends that the measure of the remedy "should be the greater of Colorado's gains or Kansas' losses." Kan. Brief re Statement of Position at 23. Moreover, Kansas states that Colorado's benefits from violating the compact "are expected to be higher than Kansas' injury," and, if so, the amount of the recovery should correspond to the gains in Colorado resulting from the use of Kansas' entitlement. *Id.* at 4. There is no direct Supreme Court precedent on the measure of damages in a case such as this.

While this issue has been presented on briefs, earlier evidence in the trial outlines generally the kind of benefits that have accrued to Colorado farmers from increased use of groundwater. Much of the uncertainty and insecurity associated with surface flows were eliminated. Water became available when needed to improve crop yields. Total water supplies were increased for typically water-short ditches. Some high value specialty crops became possible. In short, overall farm productivity increased, but at the cost of depletions at the Stateline. The Kansas argument begins by characterizing these benefits as "ill-gotten gains," or "illegal profit," and relies on cases that do use these terms and order the divestment of the "benefits of unlawful activity." Kan. Brief re Statement of Position at 5, 8, 9. Kansas argues further that all such benefits or gains should be eliminated in order to

minimize the incentives that a state might otherwise have to violate an interstate compact or, at least, to neglect to comply therewith. *Id.* at 5, 6-7.

At the outset, I believe that Kansas' characterization of the increased use of groundwater in Colorado is unduly harsh. Most of the postcompact wells in Colorado were lawfully drilled at a time when wells were unregulated. When Kansas filed this case, there were approximately 2062 large irrigation wells, of which 1842 were in existence before 1965. Colo. Exh. 165*, Table A-1. As the Colorado Supreme Court noted in one of its decisions, there had been "virtually no regulation of wells" prior to the adoption of the 1973 Rules. Colo. Exh. 387 at 296. However, if Colorado was slow in coming to grips with well development, so was Kansas. In Kansas, about 416 wells were in existence in 1949 in the three-county area from the Stateline to Garden City. Colo. Exh. 257*. This number had increased to 1999 by 1985. *Id.*; RT Vol. 86 at 109-111. For the period 1968-85, pumping within the several canal company service areas in Kansas averaged about 79,400 acre-feet annually. It reached a high of 149,800 acre-feet in 1981. Kan. Exh. 327 at 9, Table 10A. Kansas did not begin to regulate well through the issuance of permits until 1978. RT Vol. 28 at 6; RT Vol. 37 at 27, 32.

In both states, sophisticated systems for the establishment and regulation of surface water rights had long been in place. However, before the development of the vertical turbine pump and the availability of inexpensive electrical power, there had been little regulatory need to be concerned about groundwater pumping. The "big surge" in well development along the Arkansas River

came in the 1950s and early 1960s when there was no governmental system in either Colorado or Kansas to regulate well drilling and pumping. RT Vol. 76 at 102.

Although by the 1970s the extent of pumping in Colorado was a matter of common knowledge, that is not to say, as I concluded in my earlier report, "that the impact of such pumping on usable Stateline flows was generally known or understood." Report of Special Master at 169. Wells *per se* do not violate the compact. Only if they cause a material depletion in usable Stateline flows are they wrongful. Determining what flows are usable, and the depletions of usable flow in contrast to depletions of total flow, is a complex matter. And as the Supreme Court noted in its earlier Opinion, isolating the impacts of wells on usable Stateline flow was rendered all the more difficult because of other changing conditions during the 1970s and 1980s. The 1970s were generally dry years, and some reduction in flow would have occurred apart from pumping. Pueblo Dam came on line in 1976 and began to reregulate native flows. Transmountain imports were also increased during this period, which to some extent provided an offset to pumping. The Winter Water Storage Program was instituted. Finally, there was no quantitative or specific entitlement against which depletions to usable flow could be judged. *Kansas v. Colorado*, 514 U.S. 675, 131 L.Ed.2d 759, 775, 115 S.Ct. 1733 (1995).

This is not a case in which Colorado deliberately set out to reap the benefits of a wilful failure to perform its obligations under the compact. Had its actions been intentionally illegal, or as wilful and knowing as the factual situations in the cases on which Kansas relies,

there might have been more validity to Colorado's defense of laches.

Both states recognize that an interstate compact is both a contract and a law of the United States. *Petty v. Tennessee-Missouri Ridge Commission*, 359 U.S. 275, 285, 3 L.Ed.2d 804, 79 S.Ct. 785 (1959); *Texas v. New Mexico*, 462 U.S. 554, 564, 77 L.Ed.2d 1, 103 S.Ct. 2558 (1983). Thus, treating Colorado's violations of the compact as a violation of federal law, Kansas cites a number of cases upholding the equitable jurisdiction of the courts to order the disgorgement of profits illegally acquired. The leading case is *Porter v. Warner Holding Co.*, 328 U.S. 395, 90 L.Ed. 1332, 66 S.Ct. 1086 (1946). That suit, brought by the Price Administration under the Emergency Price Control Act of 1942, sought restitution of rents collected in excess of required rent ceilings. The District Court enjoined future excess charges, but held that it lacked jurisdiction to order restitution. The Supreme Court found, however, that the absence of specific authority in the statute did not limit the broad equitable powers of a court to secure complete justice, and to compel the defendant to "disgorge profits." 328 U.S. at 398-99. Restitution of the excessive rent charges gave effect to "the policy of Congress," and the case was remanded so the court could "exercise the discretion that belongs to it." 328 U.S. 395 at 400, 403.

The same issue of whether a court's equitable jurisdiction was limited by the remedies authorized by the statute arose in *Mitchell v. Robert De Mario Jewelry*, 361 U.S. 288, 4 L.Ed.2d 323, 80 S.Ct. 332 (1960). In that case, several employees had sought the aid of the Secretary of Labor under the Fair Labor Standards Act to recover

wages allegedly unpaid. Ultimately, the employer retaliated by discharging the employees, and the Secretary brought suit to require reinstatement and to recover the payment of lost wages. While the statute did not specifically provide for the recovery of lost wages, the Supreme Court found that a court of equity had inherent jurisdiction to give effect to the policy of the legislature, and that the statute should not be lightly interpreted to deprive the courts of this power.

These two Supreme Court decisions are frequently cited in enforcement actions of other federal statutes, supporting the equitable power of courts to order disgorgement as a remedy "for the purpose of depriving the wrongdoer of his ill-gotten gains and deterring violations of the law." *Commodity Futures Trading Commission v. American Metals Exchange Corp.*, 991 F.2d 71 (3rd Cir. 1993). See *CFTC v. Hunt*, 591 F.2d 1211 (2nd Cir. 1979) involving the Commodity Exchange Act; *SEC v. Patel*, 61 F.3d 137 (7th Cir. 1995) involving deliberate fraud against the FDA, a 27-month term of imprisonment, and violations of the Securities Exchange Act; and *Interstate Commerce Commission v. B & T Transportation Co.*, 613 F.2d 1182 (1st Cir. 1980) involving an action under the Motor Carrier Act to enjoin the collection of charges not reflected in filed tariffs, and for restitution of the overcharges.

In these cases, we find the courts exercising equitable jurisdiction to recover excess charges, to disgorge illegal profits gained from insider trading information, and to require payment of lost wages. Each case represents an aspect of the court's broad equitable powers. At the same time, however, it is recognized that the *exercise* of such jurisdiction remains a matter of discretion:

> "The inherent equitable jurisdiction which is thus called into play clearly authorizes a court, *in its discretion*, to decree restitution of excessive charges in order to give effect to the policy of Congress." *Porter v. Warner Holding Co., supra*, 328 U.S. at 400, emphasis added.

In the context of the present case, it is my view that the quantification of damages proposed by Kansas reaches too far, and if money is to be part of the remedy, that the Court's discretion should be exercised to limit the measure of damages to the losses suffered by Kansas. As I indicated in my first Report:

> "I do not believe that Colorado officials thought they were sanctioning a compact violation in the well regulations that were established, or in their failure to adopt specific regulations to protect usable Stateline flows, or in the issuance of new well permits." Report at 169.

The lack of wilfulness behind Colorado's violation of the Compact serves to distinguish the cases cited by Kansas in support of its proposed measure of damages.

Moreover, while Kansas should be made whole with respect to past violations of the compact, it is also appropriate that the remedy not result in a windfall. If it is true that differences in soils, climate, crop values, economic multipliers or other factors may result in a higher value for Arkansas River water used in Colorado than in Kansas, reliance upon those factors to quantify damages could result in a windfall recovery. This issue surfaced in *Texas v. New Mexico* before the damages were settled by stipulation. New Mexico cited two reports prepared by Texas' economist. These reports apparently estimated that

Texas' losses from past underdeliveries were approximately 50 million dollars. On the other hand, the reports indicated that New Mexico obtained an economic benefit from the use of that water in excess of one billion dollars. While New Mexico stated that these values were grossly exaggerated, it did not dispute "the qualitative fact that New Mexico's economic benefit from not delivering a quantity of water at the state line (or her economic loss from having to deliver it) greatly exceeds the economic benefit that Texas could gain from using the same quantity of water." New Mexico's Pre-hearing Brief at 15, fn. 10. The issue of a possible windfall was not settled in *Texas v. New Mexico*. However, it does not seem appropriate that Kansas' recovery in money should exceed what would have occurred had there been no violation of the compact.

Kansas argues that quantifying damages in terms of Colorado's gain is neither a windfall nor a penalty, but rather minimizes the incentive that a state would otherwise have to evade the obligations imposed by an interstate compact. This argument was also touched upon in *Texas v. New Mexico* where the court stated:

> "It might also be said that awarding only a sum of money would permit New Mexico to ignore its obligation to deliver water as long as it is willing to suffer the financial penalty. But in light of the authority to order remedying shortfalls to be made up in kind, with whatever additional sanction might be thought necessary for deliberate failure to perform, that concern is not substantial in our view." 482 U.S. at 132.

I do not see the measure of damages suggested by Kansas as being an effective deterrent to compact violations. Interstate water cases are simply too complex to be guided by the potential form of remedy. And I have no doubt about the power of equity to provide complete relief, perhaps even looking to upstream gain under appropriate circumstances.

While an interstate compact approved by Congress becomes a law of the United States, still a "Compact is, after all, a contract." *Petty v. Tennessee-Missouri Bridge Commission*, 359 U.S. 275, 285, 3 L.Ed.2d 804, 79 S.Ct. 785 (1959); *Texas v. New Mexico*, 482 U.S. 124 at 128, 96 L.Ed.2d 105, 107 S.Ct. 2279 (1987). Ordinarily, contract damages are based upon the injured party's "expectation interest," as measured by:

> (a) The loss in the value to the injured party of the other party's performance caused by its failure or deficiency, plus
>
> (b) Any other loss, including incidental or consequential loss, caused by the breach, less
>
> (c) Any cost or other loss that the injured party has avoided by not having to perform.

Restatement (Second) of Contracts § 347 & comment (1979). In the alternative, damages may be awarded based upon the injured party's reliance interest. *Id.* at Section 349. Thus, under general principles of contract law, money damages would not be based upon Colorado's benefit, but rather on Kansas' loss. Kansas cites some specific performance and trust cases, but those precedents are not applicable to these facts.

It should be remembered, however, that this is not merely an action at law for breach of contract. It is a case between two states brought under the original jurisdiction of the United States Supreme Court. The court's jurisdiction in such cases is "basically equitable in nature." *Ohio v. Kentucky*, 410 U.S. 641, 648, 35 L.Ed.2d 560, 93 S.Ct. 1178 (1973). Yet the court's power is not restricted by traditional equity rules. As I wrote in my earlier opinion:

> "It would be a mistake, however, to decide the issue solely on the basis of conventional equity rules. In establishing the Supreme Court's original jurisdiction over litigation between states, the constitution does not speak of 'cases in law or equity,' as it does in certain other situations. Rather it refers simply to 'controversies' between states. Commentary on the difference between cases and controversies has been inconsistent and inconclusive (see 36 CJS 20 [Federal Courts § 1]; 1A CJS 302, 315, 316 [Actions §§ 1, 5c, 6]), but the constitutional language does suggest that the interstate jurisdiction is not necessarily locked into rules of either common law or equity. And in exercising this 'unprecedented' grant of judicial power (Charles Warren, 'The Supreme Court and Sovereign States,' [Stafford Little Lectures for 1924], Princeton Univ. Press, p. 32), the Court has treated it as sui generis – a substitute for the treaty and war powers which the states surrendered when the constitution was established. *Rhode Island v. Massachusetts*, 37 U.S. (12 Pet.) 657, 725, 9 L.Ed. 1233, 1260 (1838); *Kansas v. Colorado*, 185 U.S. 125, 140, 46 L.Ed. 838, 844, 22 S.Ct. 552 (1902); *North Dakota v. Minnesota*, 263 U.S. 365, 372-73, 68 L.Ed. 342, 345, 44 S.Ct. 138

(1923); *Idaho v. Oregon*, 462 U.S. 1017, 1031, note 1, 77 L.Ed.2d 387, 400, 103 S.Ct. 2817 (1983).

> As Chief Justice Taney explained in 1855, traditional chancery practice is an 'analogy' in these cases but is not controlling. *Florida v. Georgia*, 58 U.S. (17 How.) 478, 492, 15 L.Ed. 181, 189 (1855). Thus viewed, the inquiry really is one of fundamental justice rather than what is the historical or even the current practice of courts exercising less extraordinary powers. It is in this sense that the Court has observed that proceedings under its original jurisdiction are 'basically' equitable in nature. *Ohio v. Kentucky, supra*, 410 U.S. at 648, 35 L.Ed.2d at 567, 93 S.Ct. 1178 (1973)." Report at 150-51.

Most recently, the Court has indicated that the remedy in a compact case, which I deem to include the measure of damages, should provide a "fair and equitable solution that is consistent with the Compact terms." *Texas v. New Mexico*, 482 U.S. 124, 134 (1987).

A. Conclusion.

I conclude, therefore, that if a suitable remedy in this case should include money damages, those damages should be based upon Kansas' loss rather than any gain to Colorado, subject to the overriding consideration that the remedy provide a fair and equitable solution.

SECTION XIV

THE FLEVENTH AMENDMENT

A. Introduction.

If money damages are to be awarded, Colorado contends that the 11th Amendment to the United States Constitution precludes any recovery based on losses sustained by individual water users in Kansas. That Amendment provides:

> "The judicial power of the United States shall not be construed to extend to any suit in law or equity, commenced or prosecuted against one of the United States by Citizens of another State, or by Citizens or Subjects of any Foreign State."

The Amendment was adopted in 1797 out of concern that the federal courts would otherwise entertain private suits against states without regard to the sovereign immunity which they had enjoyed before ratification of the constitution. *Chisholm v. Georgia*, 2 U.S. [2 Dall.] 419, 1 L.Ed. 440 (1972). Apparently the failure to raise the issue at the constitutional convention had been something of an oversight, and there was general support for liberating the states from the prospect of adverse federal litigation, especially litigation by British creditors.

In our own time, renewed political interest in states' rights has prompted a resurgence of 11th Amendment discussion, and the Court has reviewed the origins and history of the amendment at some length. See, for example, the several opinions in *Seminole Tribe of Florida v. Florida*, 517 U.S. ___, 134 L.Ed.2d 252, 116 S.Ct. 114 (1996). The majority there held that Congress did not have the power under the Indian Commerce Clause to abrogate a

state's sovereign immunity. Even more recently, the Court has considered the scope of the *Ex parte Young* doctrine which allows suits under appropriate circumstances to proceed against state officers for injunctive relief based on alleged violations of federal law. *Idaho v. Coeur d'Alene Tribe of Idaho*, 1997 U.S. Lexis 4030. However, such a suit cannot be the functional equivalent of a suit against the state so as to render its 11th Amendment protection meaningless.

At the outset two distinctions need to be made:

(1) Unlike many 11th Amendment cases, ours does not involve the issue of jurisdiction itself. The Court has already taken jurisdiction, and in fact has determined the liability questions associated with the dispute. The questions which now implicate the 11th Amendment have to do with remedy – the extent to which the Court may look to losses sustained by farmers in Kansas when fashioning an award to the State of Kansas.

(2) In the final paragraph of its briefing on this subject (pages 40-41), Colorado refers to two types of damages which apparently it recognizes as proper under the 11th Amendment: damages based on injury to Kansas' own proprietary rights, and damages based on Kansas' role as a "quasi-sovereign."[20] Kansas has not yet

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[20] "Finally, if repayment is in money, it must be limited to damages on Kansas' proprietary and quasi-sovereign interests. The Eleventh Amendment precludes an award based on the economic injuries of individual Kansas water users." Colo. Reply Brief at 40-41. Colorado also states that it does not dispute that injury to the Kansas general economy and loss of governmental revenue would be appropriate to consider. Colo. Reply Brief at 26.

pointed to proprietary losses of its own, and therefore our inquiry into the 11th Amendment at this point becomes a question of whether injuries to Kansas citizens are embraced within the concept of quasi-sovereignty, or whether there is any other basis for including the losses to Kansas water users in determining Kansas' damages.[21]

During oral argument on a draft of this Second Report, counsel for Colorado responded that damages to Kansas' proprietary rights might include reduction in the State's groundwater supplies, caused by diminished recharge from the river and increased pumping to make up for river shortages.[22] RT Vol. 169 at 58-59. Counsel also indicated that probably some losses to the general economy of Kansas could be established. *Id*. at 59. It is not clear whether these losses would be considered as injuries to proprietary or quasi-sovereign rights. Nonetheless, in determining such damages counsel acknowledged that it would be necessary to begin the analysis with losses suffered by Kansas water users as a result of the compact violations. *Id*. at 59-61. However, in his view, the 11th Amendment would preclude their inclusion in the ultimate damage figure.

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[21] Kansas takes the view that its entitlement "to a complete remedy for breach of the Compact" arises from its sovereign interest as a *party* to the Compact, and not from a *parens patriae* or quasi-sovereign interest. Kan. Reply Brief at 27, emphasis added.

[22] Counsel cautioned, however, that Colorado had not engaged an economist, and his responses to my questions on damages, and how damages should be determined, were without benefit of expert help, and should be understood with that reservation. RT Vol. 169 at 58, 60.

Although not always referred to by that name, quasi-sovereignty is of long standing in our law. It does not lend itself to a "simple or exact definition." *Alfred L. Snapp & Son v. Puerto Rico*, 458 U.S. 592, 601, 73 L.Ed.2d 995, 102 S.Ct. 3260 (1982). It refers to action by a state which is not based on its own proprietary or other rights as a sovereign, nor on private interests pursued by the state as a nominal party. Rather, it is a general interest that the state has in the well-being of its citizens, and which it is fitting that the state promote and defend in court. Colorado acknowledges that a state's quasi-sovereign and *parens patriae* interests are sufficient under a number of cases to support jurisdiction here and the issuance of injunctive relief. Colo. Reply Brief at 34. But Colorado contends that these authorities should not be read as allowing a state "to make claims on behalf of individual citizens," or to collect damages "based on injuries suffered by individual water users." *Id.* at 35, 2.

Of course, this action is no mere contrivance by Kansas to obtain damages for its water users. Rather, it is the State of Kansas that seeks damages, which it contends should be measured in part by the losses suffered by individual farmers. In *Texas v. New Mexico*, counsel argued that any such damages might go into the state's general fund, "rather than benefit those who were hurt." 482 U.S. at 132, n. 7. The Supreme Court responded:

> "But the basis on which Texas was permitted to bring this original action is that enforcement of the Compact was of such general public interest that the sovereign State was a proper plaintiff. See *Maryland v. Louisiana*, 451 U.S. 725, 735-739 (1981). It is wholly consistent with that view

> that the State should recover any damages that may be awarded, money she would be free to spend in the way it determines is in the public interest." *Texas v. New Mexico*, 482 U.S. at 132 n.7.

It is the same situation here. Any damages will go to the State of Kansas, to be spent as it decides, and not to individual water users.

It is interesting to note, however, that Colorado's proposed "water remedy" seems to run contrary to its views on the 11th Amendment. Colorado proposes to make up the historic shortfall in usable Stateline flows by delivering additional quantities of water (over and above that which may be required for current compact compliance) to present and future users of Arkansas River water in Kansas. Such deliveries likely would be of direct benefit to Kansas farmers – as opposed to damages paid to the State of Kansas – as compensation for past violations of the compact. In short, Colorado seems to contend that the 11th Amendment bars money compensation to the state based on losses to its citizens, but does not preclude compensation in water which may be delivered directly to those citizens. However, in oral argument Colorado responded that any deliveries of water under a water remedy would be made at the Stateline to Kansas, not to its users. It argued that Kansas could require that the excess water be used, for example, to recharge a groundwater area of the state that had nothing to do with the compact or the Arkansas River. RT Vol. 169 at 70-73. To be sure this might be theoretically possible, but also highly unlikely. In all probability, make-up water delivered into the Arkansas River and measured at the Stateline would

go to the benefit of those ditch systems that were shorted by virtue of the compact violations.

B. The Shaping of the Law.

In my review of this subject, I have found it helpful to examine the cases more or less chronologically, since there has been some shaping of the underlying principles over the years.

At first the only interstate cases under the Court's original jurisdiction were boundary cases. By their very—nature such disputes involve sovereignty. They involve territory, a piece of the state itself, and obviously the state has a direct governmental interest as a state. But citizens, residents and property owners in the affected area are also directly impacted. A judgment adjusting a boundary determines whose laws are to be obeyed, whose officials will levy taxes, whose judges will decide cases, and whose rules will be used to deraign titles and resolve commercial disputes. Substantial private gains and losses can result, and it is clear that private rights of the type contemplated by the amendment will at times be adjudicated by the federal judiciary.

Notwithstanding this inevitable involvement of private rights in boundary cases, the early Court refused to accept jurisdiction over strictly private disputes. Not surprisingly, a number of attempts to avoid this result were made, sometimes with the active participation of a plaintiff state. See e.g., *New Hampshire v. Louisiana*, 108 U.S. 76, 27 L.Ed. 656, 2 S.Ct. 176 (1883), where bonds of the State of Louisiana were assigned to the State of New Hampshire by one of its citizens for collection by the State. All

expenses of litigation were paid by the original private bondholder. No state funds could be expended in the proceedings, and any recovery had to be paid over by New Hampshire to the original bondholder. The Court found that the state could not "allow the use of its name in such a suit for the benefit of one of its citizens" in order to avoid the 11th Amendment. *Id.* at 661.

These efforts seem to have come to a head in 1904 with the Court's decision in *South Dakota v. North Carolina*, 192 U.S. 286, 48 L.Ed. 448, 24 S.Ct. 269 (1904). Two brothers, bankers and brokers in New York City, owned a large number of railroad bonds on which the State of North Carolina had become liable. The State of South Dakota, by statute, arranged to accept a donation of ten of the bonds and then brought suit to enforce them in the United States Supreme Court under original jurisdiction. South Dakota also named as defendants two individuals as representatives of other bondholders. While no conditions were attached to the state's title to its bonds, the Court acknowledged that the gift was made under the "not unreasonable expectation" that South Dakota's action "might enure to his benefit as the owner of other like bonds." *Id.* at 310. The Court, in a 5 to 4 decision, with a strong dissent by Mr. Justice White, accepted jurisdiction and gave judgment for South Dakota – but only on the bonds which it directly owned. The separate cause of action in which South Dakota sought relief for the other bond holders on class action principles was summarily rejected by the majority. In short, none of the Justices was willing to allow private claimants to ride on the coattails of this interstate suit.

The law has now been long established that the state must be more than a nominal party if the protection of the Eleventh Amendment does not apply. *Maryland v. Louisiana*, 451 U.S. 725, 737, 68 L.Ed.2d 576, 101 S.Ct. 2114 (1981); *Alfred L. Snapp & Son v. Puerto Rico*, 458 U.S. 592, 73 L.Ed.2d 995, 102 S.Ct. 3260 (1982). In order to invoke the original jurisdiction of this Court, the state must bring the action "on its own behalf and not on behalf of particular citizens." *Hawaii v. Standard Oil Company of California*, 405 U.S. 251, 258 fn. 12, 31 L.Ed.2d 184, 92 S.Ct. 885 (1972).

Shortly thereafter, in 1907, the decision in *Kansas v. Colorado*, 206 U.S. 46, 51 L.Ed. 956, 27 S.Ct. 655 (1907) established the principle of equitable apportionment of interstate streams; Kansas was allowed to sue on behalf of its citizens claiming rights to Arkansas River water. The alleged facts demonstrated a sound basis for quasi-sovereignty, but the extent of relief available in such an apportionment remained uncertain because of the factual finding that Colorado had not deprived Kansas of its share of the river. This case and its predecessor, *Kansas v. Colorado*, 185 U.S. 125, 46 L.Ed. 838, 22 S.Ct. 552 (1902) are among the cases cited more recently by the Court as examples of states successfully representing the interests of their citizens. *Alfred L. Snapp & Son v. Puerto Rico*, 458 U.S. 592, 603, 73 L.Ed.2d 995, 102 S.Ct. 3260 (1982).

Fifteen years later, in a dispute involving the Laramie River, the Court decided another interstate stream apportionment, and this time there was a judgment ordering relief. *Wyoming v. Colorado*, 259 U.S. 419, 66 L.Ed. 999, 42 S.Ct. 552 (1922). However, on the question of the scope of relief, the decision is of limited value as a precedent since

both states follow the rule of prior appropriation, and for that reason the Court held that it would use that doctrine as the standard for dividing the river between them.

Nonetheless, of special relevance to the present issue is the way in which the Wyoming decision determined each state's share of the stream. The Court based its apportionment directly on the water rights of individual water users. Moreover, in doing so, it expressly adjudicated particular water rights which happened to be in controversy. For example, the opinion discussed at length the evidence relating to one priority date which Colorado claimed under the doctrine of relation, and it was held that the correct date was substantially later. Colorado's position throughout that litigation was that the case was one solely between two states, and that the Court could not determine private water rights. The Court, however, in effect abolished the line between the two states, recognizing an interstate priority for each appropriation.

Over the next eighteen years the Court issued three additional Laramie River decisions clarifying what it had done – clarification of particular significance to the argument presented by Colorado now. In *Wyoming v. Colorado No. 2*, 286 U.S. 494, 76 L.Ed. 1245, 52 S.Ct. 621 (1932), the Court issued an injunction enforcing one of the water rights it had recognized in the original decision – thus suggesting that in 1922 it had actually adjudicated private claims on the river. Then in *Wyoming v. Colorado No. 3*, 298 U.S. 573, 80 L.Ed. 1339, 56 S.Ct. 912 (1936), the Court emphasized the overriding importance of the total amount allowed to Colorado, but nevertheless, issued an injunction as to one specific water right which had been covered in the original decree. The result was to leave the

matters somewhat uncertain as to what the Court had undertaken to do. Finally, in *Wyoming v. Colorado No. 4*, 309 U.S. 572, 84 L.Ed. 954, 60 S.Ct. 765 (1940), the Court discussed all three of the previous cases and explained what actually had been intended.

With respect specifically to the injunction issued in the 1936 decree, the Court explained (309 U.S. at 579) that "this was manifestly upon the assumption that Colorado was otherwise using the total amount of water allocated to that State." The Court added that "it was not intended to restrict Colorado in determining the use of the water of the river, according to Colorado laws and adjudications, provided the diversions did not exceed the aggregate amount of 39,750 acre feet to which Colorado was entitled . . . " The holding was that the total share allocated to each state was the true adjudication of 1922, and each state was thereafter free to adjust individual rights within its borders in accordance with its own laws. Mr. Justice Van Devanter's painstaking evaluation of individual rights in 1922 was merely a means to an end; the individual rights served only as a *basis* for the overall apportionment of the stream between Colorado and Wyoming. In short, the Court in 1922 did exactly what Colorado now says it cannot do.

Meanwhile, in the year following *Wyoming v. Colorado No. 1*, the Court reiterated its opposition to actual adjudication of private claims in a suit between states. *North Dakota v. Minnesota*, 263 U.S. 365, 68 L.Ed. 342, 44 S.Ct. 138 (1923). This time the subject was not bonds but water damage on an interstate stream. North Dakota alleged that construction work by Minnesota upstream had caused flooding in North Dakota with resulting damage

to North Dakota itself (in the amount of $5,000) and to individual farms (in the amount of over $1 million). Ultimately the Court found that Minnesota was not responsible for the damage. However, it held that on proper facts it would issue an injunction in favor of North Dakota, but would not entertain the claims of the individual farmers even though presented by the state. Simply put, it reiterated the position taken in *South Dakota v. North Carolina*.

However, I find no inconsistency in the Wyoming and North Dakota cases. In Wyoming, individual claims were recognized as a basis for determining the state's total share of the stream. In North Dakota, individual damage claims were refused recognition because recovery was sought for the claimants themselves, who were actually financing the litigation. The Court found that each of the farm owners expected "to share in the . . . damages here sought in proportion to the amount of his loss," and that it was "inconceivable" that North Dakota would prosecute the damage phase of the case without intending to turn any recovery over to the individual farm owners. 263 U.S. at 375.

On the same day as the original Wyoming decision (and by means of a one-sentence reference to the principles of that case) the Court held that a Nebraska corporation could appropriate water of the North Fork of the Republican River in Colorado, and transport it across the state line for use in Nebraska. This was true notwithstanding Colorado's claim to ownership of, and the power to regulate, all the waters within its boundaries. *Weiland, State Engineer of Colorado, v. Pioneer Irrigation Co.*, 259 U.S. 498, 502, 66 L.Ed. 1027, 42 S.Ct. 568 (1922). There was no apportionment by the Court, but the right of

Nebraska citizens to some share of this interstate stream was declared to be constitutional.

In 1938, the Court in *Hinderlider v. La Plata River & Cherry Creek Ditch Co.*, 304 U.S. 92, 82 L.Ed. 1202, 58 S.Ct. 803 (1938), reaffirmed and expanded on the principles of the Kansas and Wyoming decisions. As its title indicates, that case was not brought under the original jurisdiction, but defendant Hinderlider was the state engineer of Colorado, and defended his regulatory action on the ground that the rotation he used in managing the river in Colorado was authorized by a compact between Colorado and New Mexico. The opinion is an important pronouncement on the law of interstate streams. To begin with, the Court ruled that equitable stream apportionment between states may be accomplished by compact as well as by judgment. In doing so, the Court noted that use of the rule of prior appropriation in the Wyoming case was due to the fact that both states followed that rule, and it did not preclude the use of a different approach in other cases, such as the rotation agreed upon in the Colorado-New Mexico compact. Most important, the Court held that even private Colorado rights which had vested before the compact were subject to the compact. Colorado's share of the stream was determined by the compact, and the total of all Colorado's rights could not exceed that share. Accordingly, the early priority date of the plaintiff's appropriation was unavailing to the extent that it conflicted with the management system agreed upon between the states.

In 1943, the Court decided the second Arkansas River case, this time involving a suit brought by the State of

Colorado to bar a group of Kansas citizens from prosecuting actions against water users in Colorado to adjudicate their respective rights to Arkansas River water. *Colorado v. Kansas*, 320 U.S. 383, 88 L.Ed. 116, 64 S.Ct. 176 (1943). Colorado sought a decree "that Kansas and her citizens be enjoined from litigating, or attempting to litigate, the relative rights of the two states *and their citizens. . . .*" 320 U.S. at 388, emphasis added. Colorado alleged that "no proper settlement of the relative rights of the States can be obtained in suits by Kansas appropriators and against Colorado appropriators." *Id.* The Court once again found, as it had in 1907, that Colorado was not taking more than its reasonable share and granted the injunction. But the Court also strongly urged the two states to seek a more permanent allocation through an interstate compact. The present Arkansas River Compact is expressly based on the decision in that case. Compact, Art. II.

In the latter half of this century there has been some development of the Court's attitude toward the coupling of private claims with those of a state suing as quasi-sovereign. Thus, in *Maryland v. Louisiana*, 451 U.S. 725, 68 L.Ed.2d 576, 101 S.Ct. 2114 (1981), a divided Court adopted a more favorable approach toward allowing a state to represent its citizens under that doctrine. There, Maryland and several other states challenged the constitutionality of Louisiana's "first-use" tax on natural gas, and also sought recovery of the taxes already paid. *Id.* at 728, 734. The complaint estimated the direct injuries to the plaintiff states at $1.5 million, and to their citizen consumers of gas at $120 million. 451 U.S. at 736, note 12. Among other things, the Court said:

"Jurisdiction is also supported by the States' interest as parens patriae. A State is not permitted to enter a controversy as a nominal party in order to forward the claims of individual citizens. See Oklahoma ex rel. Johnson v. Cook, 304 U.S. 387, 82 L.Ed. 1416, 58 S.Ct. 954 (1938); New Hampshire v. Louisiana, 108 U.S. 76, 27 L.Ed. 656, 2 S.Ct. 176 (1883). But it may act as the representative of its citizens in original actions where the injury alleged affects the general population of a State in a substantial way. See, e.g., Missouri v. Illinois, 180 U.S. 208, 45 L.Ed. 497, 21 S.Ct. 331 (1901); Kansas v. Colorado, 185 U.S. 125, 46 L.Ed. 838, 22 S.Ct. 552 (1902); Georgia v. Tennessee Copper Co., 206 U.S. 230, 51 L.Ed. 1038, 27 S.Ct. 618, (1907)." 451 U.S. at 737.

With respect to the claim for injuries suffered by individual consumers, the Court stated:

> "As the Special Master observed, individual consumers cannot be expected to litigate the validity of the First-Use Tax given that the amounts paid by each consumer are likely to be relatively small. Moreover, because the consumers are not directly responsible to Louisiana for payment of the taxes, they of course are foreclosed from suing for a refund in Louisiana's courts. In such circumstances, exercise of our original jurisdiction is proper." 451 U.S. at 739.

C. The Compact.

One of the stated purposes of the Arkansas River Compact is to settle controversies not only between the states, but also "between citizens of one and citizens of

the other State." Compact, Art. I-A. The compact also defines the term "state" to include any person claiming rights to the Arkansas River under the authority of that state. Compact, Art. VII-A. In an interstate controversy a state has the power to represent the water claims of its people, and an interstate compact is binding upon the water users within a state. *Hinderlider v. La Plata River & Cherry Creek Ditch Co.*, 304 U.S. 92, 106, 82 L.Ed. 1202, 58 S.Ct. 803 (1938), *Wyoming v. Colorado*, 286 U.S. 494, 508-09, 76 L.Ed. 1245, 52 S.Ct. 621 (1932).

Thus, Kansas contends that under the compact a state and its citizens are treated as one. Kan. Reply Brief at 22. An injury to its people is an injury to the state. Kan. Brief re Statement of Position at 12. In the Laramie River disputes the Court observed that "the interests of the state are indissolubly linked with the rights of the appropriators" [i.e., the water use claimants in both states]. *Wyoming v. Colorado*, 259 U.S. 419, 468, 66 L.Ed. 999, 42 S.Ct. 552 (1922). And against a claim that certain individual water users were not bound by the decree because they were not parties to the suit, the Court stated:

> "In this the nature of the suit is misconceived. It was one between States, each acting as a quasi-sovereign and representative of the interests and rights of her people in a controversy with the other . . . Decisions in other cases also warrant the conclusion that the water claimants in Colorado, and those in Wyoming, were represented by their respective States and are bound by the decree." *Wyoming v. Colorado*, 286 U.S. 494, 508-09, 76 L.Ed. 1245, 52 S.Ct. 621 (1932).

Colorado voices concern that an overly broad interpretation of quasi-sovereignty could create the potential for double recovery. RT Vol. 169 at 55-56. That should not be a problem here, however. The Arkansas River Compact allows each state to represent its water users, and to bind them. If losses suffered by Kansas water users are included in any damages awarded to the State of Kansas, such a judgment should seal off any later recovery attempts by individual water users. Moreover, there is a substantial question whether Kansas water users have any forum open to them, apart from the compact. In 1943 Colorado was able to enjoin the prosecution of individual water rights litigation over the use of Arkansas River water. *Colorado v. Kansas*, 320 U.S. 383, 88 L.Ed. 116, 64 S.Ct. 176 (1943). During oral argument on the draft of this Second Report, counsel for Colorado acknowledged that his view of the Eleventh Amendment, together with the prior litigation, led to the conclusion that "Kansas water users do not have a remedy"; that there is "no way" to recover their losses. RT Vol. 169 at 56-57.

D. Conclusion.

For several reasons, I believe the Court should reject Colorado's present argument that the amount of damages to be awarded to Kansas may not take into account evidence of injuries to its water users.

First, Colorado's argument is inconsistent with the basic concept of quasi-sovereignty. When the conduct of one state toward the citizens of another state is general enough and substantial enough to call for responsive action by the second state, it is unrealistic and unfair to

say that the tribunal assigned to resolve the conflict must do so without considering the injuries suffered by those interests which are directly affected. Quasi-sovereignty (a recognized exception under the 11th Amendment) operates to avoid such a result. It throws the mantle of the state itself over the area and people involved in order to permit a general recovery for them, albeit the recovery is payable to the state itself. So long as the suit is not a subterfuge for recovery by individuals on their individual claims, quasi-sovereignty militates against rejection of any relevant evidence of injury.

Second, the key case on this subject, *Texas v. New Mexico*, 482 U.S. 124, 96 L.Ed.2d 105, 107 S.Ct. 2279 (1987), speaks broadly of providing a remedy for past breaches. The exclusion of any otherwise admissible evidence of injury would do violence to that approach. I rely on these statements by the Court:

> "We find no merit in [New Mexico's] submission that we may order only prospective relief, that is, requiring future performance of compact obligations without a remedy for past breaches. If that were the case, New Mexico's defaults could never be remedied." 482 U.S. at 128.

> "There is nothing in the nature of compacts generally or of this Compact in particular that counsels against rectifying a failure to perform in the past as well as ordering future performance called for by the Compact. By ratifying the Constitution, the States gave this Court complete judicial power to adjudicate disputes among them, Rhode Island v. Massachusetts, 12 Pet. 657, 720, 9 L.Ed. 1233 (1838), and this power includes the capacity to provide one State a

remedy for the breach of another." 482 U.S. at 128.

"[The] lack of specific provision for a remedy in case of breach does not, in our view, mandate repayment in water and preclude damages. Nor does our opinion in 462 U.S. 554, 77 L.Ed.2d 1, 103 S.Ct. 2558 (1983), necessarily foreclose such relief. There, we asserted our authority in this original action to resolve the case judicially, rather than by restructuring the administrative mechanism established by the Compact. That authority extended to devising a method by which New Mexico's obligation could be ascertained and then quantifying New Mexico's past obligation, as the Master has now done. We have now agreed with him that New Mexico has not fully performed, and we are quite sure that the Compact itself does not prevent our ordering a *suitable* remedy, whether in water or money." 482 U.S. at 130, emphasis added.

> "The Court has recognized the propriety of money judgments against a State in an original action, and specifically in a case involving a compact. In *proper original actions, the Eleventh Amendment is no barrier, for by its terms, it applies only to suits by citizens against a State.*" 482 U.S. at 130, emphasis added.

Against the background of the evidence in *Texas v. New Mexico*, which found a shortfall to Texas farmers of 340,100 acre-feet, the Court's 11th Amendment statement is certainly persuasive, and to Kansas it is dispositive. It must be acknowledged, however, that this case dealt with the question of whether any money damages could be awarded at all, and not how they might be determined.

Third, as above noted, in the Laramie River decisions the Court has already used evidence of individual claims as the basis for an interstate apportionment of water. I see no meaningful distinction between the water right claims of the *Wyoming* cases, and looking to the entitlements of individual ditches and water users in Kansas, and the shortfalls thereto, in determining the damages of the state.

Finally, in the case at hand, the State of Kansas is the signatory to the Arkansas River Compact, and the only party that can sue to protect the Stateline flows guaranteed for use by Kansas water users. The states were urged by this Court to settle their differences by compact, which they did. If a money remedy is awarded for past compact violations, the damages should include all losses that have occurred as a result of such violations, including those suffered by individual water users, subject only to the overriding consideration that the remedy must finally be a "fair and equitable solution." *Texas v. New Mexico*, 482 U.S. 124, 134, 96 L.Ed.2d 105, 107 S.Ct. 2279 (1987). The State of Kansas would be a feeble representative if it were otherwise constrained.

The fundamental rule which I see at the heart of this entire subject is that if the Court accepts a case between states as one involving sovereignty or quasi-sovereignty, it is then regarded, in law, strictly as state litigation, and the 11th Amendment is not a factor. (See *Maryland v. Louisiana*, 451 U.S. 725, 745, 68 L.Ed.2d 576, 101 S.Ct. 2114 (1981), note 21.) To adopt the Colorado view is essentially to allow the Eleventh Amendment to limit the "complete judicial power" given this Court to adjudicate disputes among the states. *Texas v. New Mexico, supra* at 128. The

Court's original jurisdiction is a substitute for the treaty and war powers which the states surrendered when they ratified the Constitution. *Rhode Island v. Massachusetts*, 37 U.S. (12 Pet.) 657, 725, 9 L.Ed. 1233 (1838); *Kansas v. Colorado*, 185 U.S. 125, 140, 46 L.Ed. 838, 22 S.Ct. 552 (1902); *North Dakota v. Minnesota*, 263 U.S. 365, 372-73, 68 L.Ed. 342, 44 S.Ct. 138 (1923). I do not believe that the Eleventh Amendment was intended to curtail this unprecedented grant of judicial power to fully adjudicate a dispute between states over the enforcement of an interstate compact.

SECTION XV

PREJUDGMENT INTEREST

In their general briefing on remedies, the states have also addressed the issue of prejudgment interest. In view of the statement in *Texas v. New Mexico*, the entitlement to post-judgment interest on any money award is apparently not in issue.[23] 482 U.S. 124, 131 n.8, 96 L.Ed.2d 105, 107 S.Ct. 2279 (1987).

Kansas argues, however, that an award of prejudgment interest is appropriate for the purpose of providing complete compensation for the injuries it has suffered as a result of Colorado's breach of the compact, whether the form of remedy is in money or water. In Kansas' view, the remedy must be in "present value terms." Kan. Brief re Statement of Position at 15. Colorado opposes such an award on equitable grounds, namely, the existence of a good faith dispute over compact compliance, the absence

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[23] In *Texas v. New Mexico*, the Special Master found an accumulated shortfall of 340,100 acre-feet, which he recommended be made up over 10 years at 34,010 acre-feet annually, together with "water interest" for any bad faith failure to deliver. 482 U.S. at 127-28. The Court noted that in the event of a water remedy, Texas would be entitled "to some form of post judgment interest for the period during which that judgment is not satisfied." *Id*. at 132, n.8. However, the Court added: "We are unpersuaded, however, that 'water interest,' rather than money, should be awarded unless and until it proves to be necessary." *Id*. Colorado states that if repayment in water is recommended, post-judgment interest would be necessary only if the water was not delivered as ordered by the Court. Colo. Reply Brief at 27. Kansas strongly disagrees since delivery of make-up water would probably have to extend over a number of years.

of any compact provisions requiring the payment of money, and because the amount of any damages is not readily ascertainable, that is, damages are unliquidated. Colo. Reply Brief at 26-33.

In essence, Colorado argues in favor of the traditional approach to prejudgment interest which allowed – and, in some jurisdictions still allows – an award of prejudgment interest *only* on a liquidated claim or a strictly construed statute. *See, e.g., Moutsopoulos v. American Mut. Ins. Co.*, 607 F.2d 1185, 1190 (7th Cir. 1979), interpreting Wisconsin law; *Clements Auto Co. v. Service Bureau Corp.*, 444 F.2d 169, 189 (8th Cir. 1971), interpreting Minnesota law; *Tenneco Oil Co. v. Gaffney*, 369 F.2d 306 (10th Cir. 1966), applying Wyoming law.

The rationale underlying the distinction between liquidated and unliquidated damages, for the purpose of awarding prejudgment interest, is that the defendant should not have to pay interest on damages that cannot be readily ascertained before judgment. By the nature of the dispute, the defendant is unable to halt the accrual of interest by making payment. Rothschild, *Prejudgment Interest: Survey and Suggestion*, 77 Nw U.L. Rev. 192, 197; D. Dobbs, *Law of Remedies* § 3.6(3) (2nd Ed. 1993)

This rationale, however, "has faced trenchant criticism for a number of years." *City of Milwaukee v. Cement Div., National Gypsum Co.*, 515 U.S. 189, 132 L.Ed.2d 148, 156, 115 S.Ct. 2091 (1995). Moreover, courts have recognized that an award of prejudgment interest *is* appropriate in order to provide complete compensation. *General Motors Corp. v. Devex Corp.*, 461 U.S. 648, 655-656, 76 L.Ed.2d 211, 218, 103 S.Ct. 2058 (1983); *Funkhouser v. J.B. Preston Co.*, 290 U.S. 163, 168, 78 L.Ed. 243, 246, 54 S.Ct. 134 (1933); *Miller v. Robertson*, 266 U.S. 243, 257-58, 69 L.Ed. 265, 45 S.Ct. 73 (1924); *Davis Cattle Co. v. Great Western Sugar Co.*, 393 F.Supp. 1165, 1187, 1192-94 (D.Colo. 1975) (applying Colorado law), aff'd, 544 F.2d 436, 441-42 (10th Cir. 1976), cert. den., 429 U.S. 1094 (1977). Further, courts have determined that prejudgment interest may be necessary to avoid unjust enrichment of a defendant who has had the use of money or things which rightly belong to the plaintiff. *Martinez v. Continental Enterprises*, 730 P.2d (Colo. 1986). They have also recognized in some instances that, if prejudgment interest is not awarded, the defendant may have an incentive to delay payment. D. Dobbs, *Law of Remedies, supra*, § 3.6(3) and cases cited.

As a consequence, a majority of jurisdictions reject the strict, traditional approach to awarding prejudgment interest. (Rothschild, *Prejudgment Interest: Survey and Suggestion, supra*, p. 204) As early as 1933, for example, the Supreme Court stated:

> "It has been recognized that a distinction, in this respect, simply as between cases of liquidated and unliquidated damages, is not a sound one. Whether the case is of the one class or the other, the injured party has suffered a loss which may be regarded as not fully compensated if he is confined to the amount found to be recoverable as of the time of the breach and nothing is added for the delay in obtaining the award of damages. Because of this fact, the rule with respect to unliquidated damages has been in evolution, and in the absence of legislation the courts have dealt with the question of allowing

> interest according to their conception of the demands of justice and practicality." *Funkhouser v. J.B. Preston Co., supra*, 290 U.S. at 163, 168-169, 78 L.Ed. 243, 54 S.Ct. 134 (1933), citations omitted.

Although it may be only dictum, and also an admiralty case, the Court's decision in *City of Milwaukee v. Cement Division, National Gypsum Co.*, 515 U.S. 189, 132 L.Ed.2d 148, 115 S.Ct. 2091 (1995) is so recent and pointed that it must strongly influence the prejudgment interest issues. At the outset, it should be acknowledged that the case involves a maritime collision under admiralty law. The general rule in such cases has been long established that prejudgment interest should be awarded, subject only to a limited exception for "peculiar" or "exceptional" circumstances. 132 L.Ed.2d at 154. The district court in this case found such unusual circumstances. It determined that the plaintiff bore 96 percent of the responsibility for the disaster, while the City of Milwaukee bore only 4 percent of the fault, and ruled that it would have been inequitable to award prejudgment interest in light of the magnitude of plaintiff's contributory negligence. The court of appeals made its own analysis of the record and changed the apportionment of liability to two-thirds to National Gypsum and one-third to the City. It also reversed the judgment, which the Supreme Court affirmed in a unanimous decision by Justice Stevens (Justice Breyer took no part in the decision).

After appropriate apportionment, the City's one-third share of damages owed to National Gypsum was

$1.677 million, but National Gypsum also sought prejudgment interest in the sum of $5.3 million.[24] In upholding an award of prejudgment interest, the Court dismissed the City's argument of a good faith dispute over its liability as having "little weight." 132 L.Ed.2d at 155. The Court was also "unmoved" by the City's contention that an award of prejudgment interest is inequitable in a mutual fault situation. *Id.* at 157. Indeed, since liability had already been apportioned, the Court stated that a "*denial* of prejudgment interest would be unfair." *Id.* "The essential rationale for awarding prejudgment interest is to ensure that an injured party is fully compensated for its loss." *Id.* at 155.

The Court also discussed the liquidated/unliquidated damage issue, noting that the distinction had never become "so firmly entrenched in admiralty as it has been at law," and indeed has faced "trenchant criticism for a number of years." *Id.* at 156. Nearly 65 years ago the Court remarked that the rule with respect to unliquidated damages "has been in evolution." *Funkhouser v. J. B. Preston, supra*, 290 U.S. at 168-69. And while the conceptual differences have not been completely reconciled outside of the admiralty context,[25] the trend of the evolution is clear: the compensatory rationale for prejudgment

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[24] The Court did not pass on the methodology used to calculate prejudgment interest, nor upon the rate to be applied.

[25] See, for example, *Blau v. Lehman*, 368 U.S. 403, 7 L.Ed.2d 403, 82 S.Ct. 451 (1962) where prejudgment interest on unliquidated damages was denied, and *Jackson County v. United States*, 308 U.S. 343, 84 L.Ed. 313, 60 S.Ct. 285 (1939) where prejudgment interest was denied on grounds of fairness.

interest has emerged as the dominant principle. Prejudgment interest will be allowed in a majority of jurisdictions irrespective of whether the obligation underlying such interest is liquidated. Rothschild, *Prejudgment Interest: Survey and Suggestion, supra.* The Court's recent decision in *City of Milwaukee* strongly suggests that the kinds of objections to prejudgment interest raised by Colorado are now obsolete.

Kansas' claim for damages in this case certainly represents an unliquidated claim. Determining the amount of depletions to usable Stateline flow has required an extensive trial. And determining the money damages as a result of the shortfall, if that should be the remedy, has yet to be tried. However, I have concluded that the unliquidated nature of Kansas' money damages does not, in and of itself, bar an award of prejudgment interest.[26]

That is not to say, however, that Kansas is necessarily entitled to prejudgment interest on any award of money damages or remedy requiring additional water to make up the shortfall. Even in admiralty cases "such an award has never been automatic." *City of Milwaukee*, 132 L.Ed.2d at 155. Allowance of interest on damages "is not an absolute right," and whether prejudgment interest ought or ought not to be allowed rests "very much in the discretion of the tribunal which has to pass upon the

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[26] "Any fixed rule allowing prejudgment interest only on liquidated claims would be difficult if not impossible to reconcile with admiralty's traditional presumption. Yet unless we were willing to adopt such a rule – which we are not – uncertainty about the outcome of a case should not preclude an award of interest." *City of Milwaukee*, 132 L.Ed.2d at 156.

subject . . . " *Id.* Interest is not recoverable "according to a rigid theory of compensation for money withheld, but is given in response to considerations of fairness." *Jackson County v. United States*, 308 U.S. 343, 352, 84 L.Ed. 313, 60 S.Ct. 295 (1939). The Court in *City of Milwaukee* stated that it had never attempted "to exhaustively catalogue the circumstances that will justify the denial of interest," but noted that "the most obvious example" would be the plaintiff's responsibility for undue delay in prosecuting the lawsuit, citing *General Motors Corp v. Devex Corp.*, 461 U.S. 648, 657, 76 L.Ed.2d 211, 103 S.Ct. 2058 (1983). *City of Milwaukee*, 132 L.Ed.2d at 155. The Court also added: "Other circumstances may appropriately be invoked as warranted by the facts of particular cases. *Id.*

In the case at hand, depletions of usable Stateline flows in violation of the compact reach back to 1950, and Kansas seeks relief, preferably in money damages, for the total amount of the shortfall since 1950. The Court has already ruled that Kansas was not guilty of laches in bringing this action, but nonetheless Kansas did not seek to file its complaint until the end of 1985. The parties then took almost five years in preparing for trial which began in September of 1990. Whether any of the circumstances and developments that have occurred since 1950 may be considered in assessing the appropriateness of prejudgment interest should be a matter of argument and proof in future proceedings of the remedies phase of this case. Much like *Jackson County v. United States*, we are without "roots in history" in approaching the issue of damages and prejudgment interest in a case of this kind. 308 U.S. at 351, *supra.*

SECTION XVI

RECOMMENDATIONS

Following the Court's May, 1995 Decision confirming my initial Report on liability, the case was remanded for further proceedings. *Kansas v. Colorado*, 514 U.S. 675, 131 L.Ed.2d 759, 115 S.Ct. 1733 (1995). The issues on which additional evidence and briefing have now been received are: (a) quantifying the depletions in usable Stateline flow for the period 1950-85; (b) quantifying depletions for the period subsequent to 1985; (c) evaluating Colorado's efforts to comply with the compact on a current basis; and (d) considering certain legal issues with respect to a remedy for past violations of the compact. This Second Report presents my recommendations on these issues. Accordingly, I recommend:

1. That the Court approve my Order of September 19, 1995 (Appendix Exhibit 3) denying Kansas' Motion for Injunction.

2. That the Court approve the Stipulation of the states quantifying depletions to usable Stateline flow caused by postcompact pumping in Colorado for the period 1950-85 in the amount of 328,505 acre-feet. Appendix Exhibit 6.

3. That depletions of usable Stateline flow for the 1986-94 period be determined to be 91,565 acre-feet.

4. That Colorado's efforts to bring the state into current compliance with its compact obligations have been sufficient to preclude at this point in time the need for interim injunctive relief, or to require changes in Colorado's Measurement Rules or Use Rules; that such

Colorado activities continue to be closely monitored through the remaining trial proceedings of this case; that compact compliance for 1996 and subsequent years be determined; and that any depletions for 1995 also be determined.

5. That the Court approve the Stipulation of the states, dated March 17, 1997 and approved by me on April 3, 1997, which together with the Resolution of the Arkansas River Compact Administration, establishes an Offset Account in John Martin Reservoir for the storage and delivery of replacement water to Kansas to offset depletions of usable Stateline flow. Appendix Exhibit 9.

6. That evidence be received on a suitable remedy for past compact violations, whether such remedy be in water or in money.

7. That if a suitable remedy in this case should include money damages, those damages should be based upon Kansas' loss rather than upon any gain to Colorado, subject to the overriding consideration that the remedy provide a fair and equitable solution.

8. That if the remedy in this case includes money damages, the 11th Amendment does not preclude damages to the State of Kansas from being based, in part, on losses incurred by its water users, again subject to the overall consideration of fairness.

9. That the unliquidated nature of Kansas' claim for damages does not bar the award of prejudgment interest, whether the remedy includes money damages or water

repayment; that the possible award of prejudgment interest will depend upon the evidence presented in future trial proceedings.

If the Court finds in accord with my recommendations in this Second Report, or otherwise, then I recommend that the case be remanded for further evidence and conclusion of the remedy phase of the trial.

Dated: September 8, 1997

Respectfully Submitted,

ARTHUR L. LITTLEWORTH
Special Master

APPENDIX – Exhibit 1

Order re Trial Proceedings for Remedies Phase, and Reallocation of Costs, filed August 11, 1995

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant, UNITED STATES OF AMERICA, Intervenor.	)	No. 105 Original October Term, 1985

ORDER RE TRIAL PROCEEDINGS FOR REMEDIES PHASE, AND REALLOCATION OF COSTS

(Filed Aug. 11, 1995)

The United States Supreme Court in its opinion dated May 15, 1995 affirmed my Report concerning the liability phase of the case, and remanded the matter for determination of the unresolved issues. (115 S.Ct. 1733) These issues relate to the remedies phase of the case, including damages and injunctive relief.

A status conference was held in Denver, Colorado, on July 27-28, 1995 to discuss future proceedings. As a result thereof, it is hereby ordered:

1. That trial will resume on the remedies phase of the case on October 30, 1995 at 9:30 a.m. in the United States Court of Appeals, Courtroom 3, 125 South Grand Avenue, Pasadena, California.

2. That the parties may present evidence on three subjects: revisions to Kansas' H-I Model in accordance with the recommendations in my Report, as affirmed by

the Supreme Court; Stateline depletions to usable flow caused by postcompact pumping in Colorado for the period 1950-85, as determined by the revised H-I Model; and the then current status of efforts by Colorado to comply with the Arkansas River Compact.

3. That with respect to the revisions to be made to the H-I Model and the modified depletion results, all computer information and all data to be offered in evidence or used in the preparation of exhibits, expert reports or testimony shall be exchanged among the parties by August 30, 1995; and the parties and their experts shall confer on or before September 6, 1995 in an effort to reach as much agreement thereon as possible.

4. That a report by the State Engineer of Colorado be provided to Kansas by September 29, 1995, setting forth in detail the actions being taken by and within Colorado to comply with the Arkansas River Compact, including any augmentation plans being developed or used by entities within Colorado, and any data collection and monitoring programs.

5. That the parties may take such depositions as may be required in connection with the subjects of the October 30 segment of the trial or the February 19, 1996 segment hereinafter discussed.

6. That on or before November 17, 1995 Kansas shall file a statement of its position with respect to damages, together with a brief in support thereof. The statement shall indicate whether Kansas seeks damages in terms of money, or in terms of water, or a combination thereof. Colorado shall have until January 19, 1996 in which to file its response, and Kansas shall have until

March 6, 1996 to reply. It is expected that the briefs will cover in general terms such issues as the measure of damages, that is, whether damages should be based on injury to Kansas or benefit to Colorado, or on some combination; water versus money damages; interest; and any impact of the Eleventh Amendment to the Constitution.

7. That the trial shall resume on February 19, 1996 at 9:30 a.m. in the United States Court of Appeals, Courtroom 3, 125 South Grand Avenue, Pasadena, California, to consider evidence on these additional subjects: Stateline depletions as determined by the H-I Model for the period 1986-94; Kansas' response to the Colorado compliance efforts presented during the October 30 segment of the trial, and any other evidence it may wish to present in regard to compliance; and continued testimony by Colorado on its program to comply with the Compact. This segment of the trial will also include a status conference to consider future proceedings.

8. That on or before December 21, 1995 Kansas shall provide Colorado with all computer information, data and files used in connection with the modeling of depletions for the period 1986-94, including any changes to the H-I Model and any recalibration results. The parties and their experts shall meet on or before January 10, 1996 in an effort to understand and to reach as much agreement as possible on the operation of the H-I Model for the 1986-94 period, and the data used in connection therewith.

9. That by January 10, 1996 Kansas will provide Colorado with copies of all expert reports or summaries

of expert testimony concerning the evidence which it proposes to present during the February 19 trial segment with respect to the Colorado compliance efforts, or its own views on compliance.

10. That where feasible, all expert studies, investigations, conclusions and opinions should be put into report form, together with supporting data, and made available to the opposing parties in sufficient time to permit them to prepare adequate cross-examination, rebuttal testimony and exhibits.

11. That in view of the United States' decision that, absent unforeseen circumstances, it will not take an active role in the remedies phase of the case, the United States is relieved as of July 31, 1995 of the obligation to pay 20% of all fees and costs incurred by the Special Master. At such time, if any, that the United States should resume an active role, its appropriate share of costs will be reexamined. After July 31, 1995 Special Master fees and costs shall be allocated equally between Kansas and Colorado.

12. That by October 30, 1995 Kansas and Colorado shall each advance for deposit in the interest-bearing trust account established in this case the sum of $50,000.00, to be applied against Special Master fees and costs.

DATED: August 11, 1995.

/s/ Arthur L. Littleworth
ARTHUR L. LITTLEWORTH
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business address is Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502.

I am readily familiar with Best, Best & Krieger's practice for collecting and processing correspondence for mailing with the United States Postal Service. Under that practice, all correspondence is deposited with the United States Postal Service the same day it is collected and processed in the ordinary course of business.

On August 11, 1995, I served the within ORDER RE TRIAL PROCEEDINGS FOR REMEDIES PHASE, AND REALLOCATION OF COSTS by placing a copy of the document in a separate envelope for each addressee named below and addressed to each such addressee as follows:

John B. Draper, Esq.
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Donald M. Gerstein
Assistant Attorney General
Natural Resources Division
123 Capitol Building
Cheyenne, Wyoming 82002

On August 11, 1995, at the office of Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502, I sealed and placed each envelope for collection and deposit by Best, Best & Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on August 11, 1995, at Riverside, California.

/s/ Sandra L. Simmons
Sandra L. Simmons

APPENDIX – Exhibit 2

Supplemental Order re Trial Proceedings,
filed September 28, 1995

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant, UNITED STATES OF AMERICA, Intervenor.	)	No. 105 Original October Term, 1985

SUPPLEMENTAL ORDER RE TRIAL PROCEEDINGS

(Filed Sep. 28, 1995)

By a conference call on September 19, 1995, counsel raised two questions with respect to my Order re Trial Proceedings for Remedies Phase, dated August 11, 1995. They asked whether the required H-I model pumping adjustments for declining well efficiencies and for non-electric pumping should be made for the whole 1950-85 period, or for the period 1964-85 only. Secondly, they asked whether the October 30 trial segment is to include evidence on the extent to which accretions may offset depletions. It was agreed that the parties would submit their respective positions by letters to be filed on September 25, 1995. In its letter, Colorado now agrees with Kansas that adjustments for nonelectric pumping should be made back to 1950, so that matter is no longer an issue.

With respect to the pump efficiency adjustments, Kansas maintains that my Report calls for such changes to be made over the full 1950-85 period, while Colorado

argues that only the period of 1964-85 should be considered. These adjustments are to be made on the basis of the Colorado evidence introduced in the liability phase of the trial, and that evidence covered the period from 1940 to 1985. Colo. Exh. 165*, Figure 6.2. However, Colorado reads the discussion in my Report of the testimony of Longenbaugh and Miles, and my statement that "I find that the 1964-68 power coefficients on average did decline," to mean that efficiency adjustments should be made only for the years 1964 and thereafter.

Colorado's evidence was based upon the 1964-68 data collected by the USGS and published in Basic-Data Release No. 21. Jt. Exh. 66. Colorado's experts then extrapolated backward in time from these data to estimate pump efficiencies in the prior years, going back to 1940. Report at 189. This analysis assumed that the older pumps in the 1940s were more efficient than those tested in the 1964-68 period, and hence pumped larger quantities of water for any given amount of power consumption. I questioned this approach because it did not take into account the replacement of centrifugal pumps in the 1940s and early 1950s by the much more efficient vertical turbine pumps. Report at 184-85, 189. However, the issue whether Colorado's analysis was sound for the 1940s does not apply to its pump efficiency adjustments for the period of 1950-64. There may have been some conversions to turbine pumps after 1950, but the impact of such later conversions on the present issue would have been relatively small. I conclude, therefore, that the pump efficiency modifications to the H-I model, as required in my Report, should be made for the full 1950-85 period.

Insofar as accretions are concerned, I did not have the issue in mind when the October 30 schedule was discussed. Certainly this is an issue that must be decided, but Kansas indicates that it cannot properly be prepared on the subject for the October 30 segment of the trial. Accordingly, my August 11 Order is augmented to add to the February 19 trial segment the presentation of evidence on the extent, if any, to which accretions calculated by the H-I model should be used to offset depletions of usable Stateline flows. I understand Colorado's desire to settle this issue as soon as possible, and if the states can agree upon an earlier schedule, the necessary trial days can probably be arranged. However, if no earlier date is agreed upon, the parties are ordered to complete depositions and any other discovery, and to exchange reports of any expert testimony, in sufficient time before February 19 to allow adequate preparation of their respective cases.

DATED: September 28, 1995.

/s/ Arthur L. Littleworth
ARTHUR L. LITTLEWORTH
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business address is Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502.

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On September 28, 1995, I served the within SUPPLEMENTAL ORDER RE TRIAL PROCEEDINGS by placing a copy of the document in a separate envelope for each addressee named below and addressed to each such addressee as follows:

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Donald M. Gerstein
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123 Capitol Building
Cheyenne, Wyoming 82002

On September 28, 1995, at the office of Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502, I sealed and placed each envelope for collection and deposit by Best, Best & Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on September 28, 1995, at Riverside, California.

/s/ Sandra L. Simmons
Sandra L. Simmons

APPENDIX – Exhibit 3

Order Denying Kansas' Motion for Injunction,
filed September 19, 1995

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant, UNITED STATES OF AMERICA, Intervenor.	)	No. 105 Original October Term, 1985

ORDER DENYING KANSAS' MOTION FOR INJUNCTION

(Filed Sep. 19, 1995)

Prior to the commencement of trial in this case, I granted Kansas' motion to bifurcate the trial into liability and remedy phases. Order, Jan. 2, 1990. The trial proceeded on this basis, and in July of 1994 I submitted my Report to the Supreme Court on the various liability issues. I recommended that the Court find that postcompact well pumping in Colorado had violated Article IV-D of the Arkansas River Compact. I found no other compact violations by either state or by the United States.

Both states filed exceptions to the Report, with briefs in support of their positions. The exceptions were argued before the Supreme Court on March 21, 1995, and the Court's Opinion was issued on May 15, 1995. 131 L.Ed.2d 759, 115 S.Ct. 1733. The Court overruled all of the exceptions of both states, and by Order dated May 15, 1995

remanded the case to me "for determination of unresolved issues in a manner not inconsistent with the opinion of this Court." The unresolved issues include the quantification of past shortages and the remedies available, including the issues of injunctive relief and damages.

On June 13, 1995 the State of Kansas filed a Motion for Injunction and requested an expedited hearing. Counsel agreed upon a briefing schedule, and the motion was argued as part of the status conference which already had been set for July 27-28, 1995 in Denver. The purpose of the status conference was to consider future proceedings with respect to the remedies phase of the case.

The Kansas motion sought a recommendation that the Supreme Court enjoin the State of Colorado from violating the Arkansas River Compact as construed in its May 15, 1995 Opinion, specifically requesting:

> "That the State of Colorado be enjoined from pumping more than 15,000 acre-feet per compact year of the waters of the Arkansas River as defined in Article IIIB of the Arkansas River Compact until such time as, and only to the extent that, Colorado has demonstrated the adequacy and guaranteed the delivery of future offsetting stateline flows to which Kansas would not otherwise be entitled under the Compact."

The motion was based on the grounds that the Supreme Court had determined that "the pumping sought to be enjoined" violates Article IV-D of the compact; that an injunction will lie to enforce the compact as a federal statute; and that requiring "immediate compliance" with the compact is appropriate, although the

amount of past depletions still needs to be determined. An affidavit supporting the motion states that current pumping in Colorado exceeds 15,000 acre-feet annually, and is "similar" to the 1950-85 figures which ranged between 145,000 and 161,000 acre-feet annually. Moreover, the affidavit states that Colorado has not guaranteed flows to offset such pumping.

Colorado responded that the motion, in effect, is a motion for a preliminary injunction, requiring a weighing of equities between the states. Colorado argues that Kansas has not shown that it will suffer immediate and irreparable injury without the injunction, or that the threatened injury to Kansas outweighs the damage to Colorado should the injunction issue. Moreover, Colorado states that there is no accepted method by which depletions can be determined, nor by which Colorado can demonstrate the adequacy of any plan to replace them. Colorado also accompanied its written Response to the motion with an affidavit of the State Engineer outlining the actions now being taken by Colorado to bring it into compliance with the compact.

The crux of the Kansas argument is that the Supreme Court has determined that pumping in excess of 15,000 acre-feet annually violates the compact. Therein also lies the principal weakness in the Kansas position. For the Supreme Court did not find, nor did I recommend, that any pumping over 15,000 acre-feet was unlawful *per se*.

During the liability phase of the trial, both states acknowledged that some pumping in Colorado did occur during the precompact years, although the pumping amounts were hotly disputed. Kansas estimated that the

highest amount was 11,000 acre-feet in 1948. Colorado experts testified to actual precompact pumping of 36,837 acre-feet, but Colorado claimed that such precompact wells had an "entitlement" which averaged 49,275 acre-feet over the 1950-85 period. I found that 15,000 acre-feet annually was the best estimate of the pumping that was occurring when the compact was being negotiated. That use of water was part of the status quo that the states were trying to preserve. Accordingly, I found that such amount of annual pumping should be allowed under the compact. However, I rejected Colorado's entitlement theory which would have allowed the precompact pumping figure to expand.

But because 15,000 acre-feet of pumping is lawful, it does not necessarily follow that any additional pumping is in violation of the compact. Article IV-D provides that the compact is not intended to prevent water development in Colorado, including the improved or prolonged functioning of existing works, provided that the waters of the Arkansas River "shall not be materially depleted in usable quantity or availability." Stateline flows are impacted not only by Colorado's pumping but also by changes in the amount of irrigated acreage, by changes in the amount of applied water on such acreage, by changes in the diversions of surface flow, and by the importation of transmountain water and the use (or nonuse) of return flows therefrom.

For the period 1950-85, for example, the evidence showed a small decline in total irrigated acreage in Colorado, but an increase in applied water per acre. Report at 268-70. Diversions, according to Colorado's evidence,

decreased about 28,000 acre-feet annually when compared with precompact amounts, without consideration of diversions from transmountain imports. Report at 270-71. During the period of compact negotiations, transmountain imports averaged approximately 43,000 acre-feet per year (although some of this water was used to supply the cities of Aurora and Colorado Springs outside of the Arkansas River Basin) while during 1950-85 the average was estimated to have increased to between 56,210 and 60,445 acre-feet for use in the Arkansas River Valley. Report at 49. What comparable data would show since 1985 is unknown.

Experts for both states testified that the only way to isolate depletions caused by postcompact pumping, as opposed to depletions caused by other changes along the stream system, was through the use of hydrologic modeling. Both states constructed such models and introduced evidence of Stateline depletions caused by pumping alone for the period 1950-85. Report at 243-290. However, all of that evidence is now ten years old. We have no data on conditions since 1985.

Moreover, at this point in the trial past depletions have not been quantified, and we have no methodology that has yet been sanctioned to predict depletions. In my Report, I found that certain adjustments will be required in the data used in both the Kansas H-I model and the Colorado water budget model. These have yet to be accomplished, although modifications to the Kansas H-I model are the subject of the next trial segment, scheduled to begin on October 30, 1995. At the recent status conference, Colorado indicated that the required changes to its own water budget model, in contrast to those required in

the H-I model, would be expensive, time-consuming and difficult. RT Vol. 144 at 61-62. Accordingly, counsel for Colorado announced that it has basically "shelved that model" (its own water budget model), and intends in the future to work through the Kansas H-I model. RT Vol. 144 at 52.

Initially, Kansas was reluctant to accept this proposal and stated that it planned to make the required adjustments to the Colorado model on its own, and to introduce evidence of the depletions therefrom for the 1950-85 period. RT Vol. 144 at 58-59. By the next day, however, Kansas recognized that its intention to run the Colorado model would cause significant complications in the prompt scheduling of future proceedings, and Kansas stated that it had decided to forego that effort. RT Vol. 145 at 5.

It appears, therefore, that the Kansas H-I model will become the accepted tool for determining Stateline depletions caused by pumping. Evidence of the required adjustments in that model for the 1950-85 period will be presented during the October 30 trial segment. At the next segment scheduled for February 19, 1996, evidence will be presented on the Stateline depletions as determined by the H-I model for the period 1986-94.

Denial of the Kansas motion now does not preclude appropriate interim relief in the future. However, the short answer to the present Kansas motion is that at this point in time the evidence does not support the 15,000 acre-feet figure. The means are not now available for me to determine the impact of current pumping.

Kansas relies heavily on the precedent set in *Texas v. New Mexico*, 482 U.S. 124 (1987). To be sure, an injunction in that case was issued before the damage phase was completed, but that case was much farther along than we are.

Prior to the Court's 1987 Opinion in *Texas v. New Mexico*, the case had been before the Supreme Court on several earlier occasions.[1] The 1949 compact between Texas and New Mexico provides that New Mexico shall not deplete flows of the Pecos River below an amount that will provide Texas with "a quantity of water equivalent to that available to Texas under the 1947 condition." *Id.* at 126. However, the Inflow-Outflow Manual incorporated into the compact and designed to determine the 1947 condition for the future "proved to be so faulty as to be unusable." *Id.* at 129, fn. 6. A new inflow-outflow manual was later developed by the Special Master, but was not finally approved by the Court until 1984 as the "methodology to be used in calculating Texas' entitlement." *Id.* at 127. The formula had to be fashioned in the course of the litigation in view of the inability of the Pecos River Commission to agree upon how the river water should be divided.

In the 1987 Opinion relied upon by Kansas, the Supreme Court issued a decree enjoining New Mexico:

> "To comply with the Article III(a) obligation of the Pecos River Compact by delivering to Texas at state line each year an amount of water calculated in accordance with the inflow-outflow

---

[1] See 446 U.S. 540, 64 L.Ed.2d 485 (1980); 462 U.S. 554, 77 L.Ed.2d 1 (1983); 468 U.S. 1238, 82 L.Ed.2d 816 (1984).

equation contained in Texas Exhibit 68, at page 2." *Id.* at 135.

In addition, the Court ordered New Mexico to calculate "the Index Inflow component of the inflow-outflow and channel-loss equations contained in Texas Exhibit 79, modified to reflect the Court's decision of June 8, 1987, as to manmade depletions chargeable to New Mexico." *Id.* The Court further ordered that "Index Inflow" shall mean "the 3-year progressive average of 'annual flood inflows' as those terms are defined in Texas Exhibit 79, Table 2, p.5." *Id.*

While by 1987 in *Texas v. New Mexico* the amount of the accumulated shortfall had been determined for the 1950-83 period (340,100 acre-feet of water), the shortfall between 1983 and the Court's 1987 Opinion still remained unquantified. The question of whether the remedy for past shortages should be in water or in money also remained open when the Supreme Court issued its injunction. In these respects there is some similarity to our situation. Yet a clear and essential difference remains between *Texas v. New Mexico* and our case at this point in time. There is no specific formula by which Kansas' "entitlement" in any given year can now be determined. And no methodology to calculate depletions to usable State-line flow has yet been approved by me, let alone by the Supreme Court. Perhaps when the H-I model is modified and extended to cover the 1985-94 period, we will have the tool necessary to calculate depletions caused by post-compact pumping. But that is not the situation now.

Kansas also invokes *Texas v. New Mexico* for the principle that an injunction will lie to enforce the compact as

a federal statute (see 482 U.S. at 128), and that in such a situation neither a showing of actual injury nor a balancing of hardships is required. It is true that there are cases to that effect, but authority on the subject is not consistent. It should also be noted that while a compact approved by Congress becomes a "law of the United States," it is still a "contract." *Id.*

Thus, in connection with the antitrust laws, one district court has held that the Clayton Act is an expression of the public policy of the nation, and "embodies" irreparable injury in the violation of its provisions. "No further showing need be made by those directed to enforce [section 7] than that it is being violated or threatened with violation." *United States v. Ingersoll-Rand Co.*, 218 F.Supp. 530, 544-545 (W.D. Pa. 1963). In affirming that case, the Court of Appeals repeated the trial court's statement that it is not necessary to show an injury, only that the "threatened act is within the declared prohibition of Congress." 320 F.2d 509, 524 (C.A. 3d 1963). (The court, however, did go on to find an actual injury.) In contrast, other federal courts have held that the plaintiff must demonstrate significant threat of injury from an impending violation of the antitrust laws (*Ralph Rosenberg Court Reporters Inc. v. Fazio*, 811 F.Supp. 1432, 1442 [D. Hawaii 1993], citing *Zenith Radio Corp. v. Hazeltine Research, Inc.*, 395 U.S. 100, 130 [1969]), and even that "the normal principles of equity are applicable" in determining whether to issue preliminary injunctions in Clayton Act cases. *Kay Instrument Sales Co. v. Haldex Actiebolag*, 296 F.Supp. 578, 579 (S.D. N.Y. 1968). Moreover, even where a statute expressly authorizes an injunction for a statutory violation (as in the federal drug cases), the court is not

required to issue one, but should exercise its equitable discretion; "injunctive relief must be used sparingly." *United States v. Barr Laboratories, Inc.*, 812 F.Supp. 458, 486, 487-488 (D. N.J. 1993).

On the question of balancing of hardships, one federal district court refused to consider that test where the defendants had violated a statute by physically disrupting a church service. *Central Presbyterian Church v. Black Liberation Front*, 303 F.Supp. 894, 901 (E.D. Mo. 1969). However, in that case the defendants' conduct was actually criminal, and it would be hard to imagine what legally cognizable hardship they could have claimed. Other courts have undertaken to balance equities where a statute is involved. In the *Barr* case above cited, the court painstakingly reviewed the evidence as to each of the many drugs in question, sometimes siding with the Government and at other times with the defendant company. See also *X Corp. v. Doe*. 805 F.Supp. 1298 (D. Va. 1992), affirmed sub nom. *Under SEAL v. Under SEAL*, 17 Fed.3d 1435 (C.A.4th 1995, No. 93-1495).

In short, the effect of an underlying statute on a request for injunctive relief can be very difficult to determine. The decisions suggest that it may well depend on the particular statute and even on the particular facts. Moreover, that question is but part of the developing relationship between legislatures and the courts of equity, a subject which has attracted considerable critical comment in recent years. See, for example, Plater, *Statutory Violations and Equitable Discretion*, 70 Cal.L.Rev. 524 (1982); Shreve, *Federal Injunctions and the Public Interest*, 51 Geo.Wash.L.Rev. 382 (1983). Since the present request for an injunction is premature, it is not now necessary to

determine what impact our particular law (the compact) may have on the Court's equity armament.

Kansas has expressed understandable concern over the possibility of delays in bringing Colorado into current compliance with the compact. Colorado is now moving through its own statutory and administrative procedures in order to develop pumping controls and programs to offset depletions. However, in view of past experience, some skepticism on the part of Kansas is not unexpected. The previous efforts of the Colorado State Engineer to control pumping during the period from 1968 to 1975 met with widespread opposition. Twice the Colorado Supreme Court struck down his regulations. Report at 117-131. Nonetheless, conditions are now quite different.

The United States Supreme Court has determined that postcompact pumping in Colorado has caused material depletions of usable Stateline flows, in violation of the compact. Colorado recognizes that I may recommend, and the Supreme Court may decree, "whatever steps are necessary" to achieve compliance. RT Vol. 144 at 39. There is no prohibition against my "imposing management standards" upon Colorado should Colorado fail to do so through its own processes. *Id.*

At the next scheduled trial segments beginning October 30 and February 19, evidence will be received on the status of Colorado's efforts to achieve compliance. Kansas will also have the opportunity to provide testimony on the adequacy of such efforts, and to present compliance measures of its own. At the conclusion of those two trial segments, we should also have data for the years 1986-94 and, it is hoped, a hydrologic model that may be used to

determine depletions. Thereafter, it may be appropriate to revisit the issue of injunctive relief.

Accordingly, Kansas' Motion for Injunction is hereby denied without prejudice.

DATED: September 19, 1995.

/s/ Arthur L. Littleworth
ARTHUR L. LITTLEWORTH
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business address is Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502.

I am readily familiar with Best, Best & Krieger's practice for collecting and processing correspondence for mailing with the United States Postal Service. Under that practice, all correspondence is deposited with the United States Postal Service the same day it is collected and processed in the ordinary course of business.

On September 19, 1995, I served the within ORDER DENYING KANSAS' MOTION FOR INJUNCTION by placing a copy of the document in a separate envelope for

each addressee named below and addressed to each such addressee as follows:

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Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on September 19, 1995, at Riverside, California.

/s/ Sandra L. Simmons
Sandra L. Simmons

APPENDIX – Exhibit 4

Order Denying Kansas' Motion to Adjust Trial Schedule,
filed February 22, 1996

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant, UNITED STATES OF AMERICA, Intervenor.	)	No. 105 Original October Term, 1985

ORDER DENYING KANSAS' MOTION TO ADJUST TRIAL SCHEDULE

(Filed Feb. 22, 1996)

On February 16, 1996 Kansas filed a motion to move the March 25, 1996 trial segment to June 17, 1996, combining it with the trial segment already set for that date. Kansas based its motion on the grounds: (1) that the trial in the Colorado Water Court for Division No. 2 on the proposed compliance Rules and Regulations has been set for March 18-29, 1996, and such Rules will not be effective until approval by that Court; and (2) that the parties have differences over pumping data for 1986-94, and changes to the H-I Model, which may be resolved with more time, but which now prevent the quantification of Compact violations for 1986-94 from being ready for presentation at the March 25, 1996 trial segment.

The March 25, 1996 trial segment is scheduled to address: Stateline depletions as determined by the H-I Model for the period 1986-94; whether accretions calculated by the H-I Model should offset depletions for the

1986-94 period; and continued developments in connection with Colorado's compliance program.

Colorado objects to the motion. Both States have filed briefs in support of their respective positions, and further argument was heard by conference call on February 21, 1996.

The fact that the Colorado Water Court proceedings may not be completed by the trial segment scheduled for March 25 does not require a delay in our proceedings, although the proposed Rules will not be effective without Water Court approval. Counsel for Colorado has indicated that the Colorado Water Court is well aware of the time considerations involved in the issues before it, and that a prompt decision may be expected. In any event, Kansas is not required to respond to the Colorado compliance efforts until our June 17 trial segment. Kansas is correct that the plans being developed under the proposed Rules involve the substance of the Colorado compliance effort. However, Colorado has given its assurance that these plans will be provided to Kansas as promptly as possible.

With respect to Stateline depletions for the 1986-94 period, it appears from the briefs and the conference call that the States will be unable to agree on the depletion amount. In part, the disagreement results from differences in pumping estimates, although those differences may yet be narrowed or even resolved. However, Colorado also argues that changes made by Kansas to the H-I Model account for some of the difference in the calculations. Kansas seems to minimize the impact of any such changes, putting its emphasis instead on Colorado's new

methodology for estimating pumping. Nonetheless, it appears that issues now exist over the use of the H-I Model. The States agreed to use the H-I Model to determine Stateline depletions, although it was also recognized that some additional changes in the Model or its calibration might be required. It is essential that any issues over the Model be resolved as early as possible. The scheduled March 25 trial segment becomes more, rather than less, important in this regard. A number of statements, allegations and denials appear in the briefs, but they have not influenced my decision on this motion. I believe, simply, that it would be better to be back in Court sooner rather than later.

Accordingly, the Kansas motion is denied. The February 21 date in Paragraph 9 of my December 7, 1995 Order for the exchange of expert reports, summaries of non-expert testimony, and exhibits is hereby changed to February 26, 1996.

Dated: February 22, 1996

/s/ Arthur L. Littleworth
Arthur L. Littleworth
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business address is Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502.

I am readily familiar with Best, Best & Krieger's practice for collecting and processing correspondence for mailing with the United States Postal Service. Under that practice, all correspondence is deposited with the United States Postal Service the same day it is collected and processed in the ordinary course of business.

On February 22, 1996, I served the within **ORDER DENYING KANSAS' MOTION TO ADJUST TRIAL SCHEDULE** by placing a copy of the document in a separate envelope for each addressee named below and addressed to each such addressee as follows:

John B. Draper, Esq.
Montgomery & Andrews
325 Paseo de Peralta
P.O. Box 2307
Santa Fe, New Mexico 87504-2307

David W. Robbins, Esq.
Hill & Robbins
100 Blake Street Building
1441 Eighteenth Street
Denver, Colorado 80202

Jeffrey P. Minear, Esq.
Assistant to the Solicitor General
Office of the Solicitor General
United States Department of Justice
Constitution Avenue & Tenth Street, N.W.
Washington D.C. 20530

James J. DuBois, Esq.
U.S. Department of Justice
General Litigation Section
999 18th Street, Suite 945
Denver, Colorado 80202

On February 22, 1996, at the office of Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502, I sealed and placed each envelope for collection and deposit by Best, Best & Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on February 22, 1996, at Riverside, California.

/s/ Sandra L. Simmons
Sandra L. Simmons

APPENDIX – Exhibit 5

Modification of April 26, 1996 Order re Trial Proceedings, filed July 10, 1996

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant, UNITED STATES OF AMERICA, Intervenor.	)	No. 105 Original October Term, 1995

MODIFICATION OF APRIL 26, 1996 ORDER RE TRIAL PROCEEDINGS

(Filed Jul 10, 1996)

Based upon the agreement of the parties, and due to the untimely death of Kansas expert witness Brent E. Spronk, Paragraphs 5, 7, and 9 of my Order of April 26, 1996, entitled "Modification of December 7, 1995 Order re Trial Proceedings" are hereby supplemented and amended to read as follows:

5. That the parties may take such depositions as may be required in connection with the subject of the September 30, 1996 trial segment hereinafter discussed, according to the following schedule:

July 15: Deposition by Kansas of Mr. Dewayne Schroeder; Deposition by Colorado of Mr. Steven P. Larson.

July 2-August 2: Depositions by Kansas of Mr. Hal D. Simpson and other persons necessary for Kansas to prepare its response to the current Colorado compliance efforts.

August 26-30: Depositions by Colorado of Kansas' witnesses on Kansas' response to the current Colorado compliance efforts.

Each state shall make its best efforts to schedule and complete depositions during the specified periods. The Special Master's approval is required for any depositions outside of the designated periods, if the states cannot reach agreement.

7. That trial shall resume on September 30, 1996, at 9:30 a.m. in the United States Court of Appeals, Courtroom 3, 125 South Grand Avenue, Pasadena, California, to consider evidence on these additional subjects: Mr. Schroeder's testimony on additional proposed changes to the H-I Model for purposes of determining Stateline depletions for the period 1986-94; rebuttal testimony by Kansas on the 1986-94 quantification, including rebuttal to Mr. Schroeder's additional proposed changes to the H-I Model; continued testimony by Mr. Simpson on the Colorado program to comply with the Compact; and Kansas' response to the current Colorado compliance efforts, including evidence presented during earlier trial segments, and any other evidence it may wish to present in regard to compliance. In the event this portion of the trial is not completed during the week of September 30, 1996, the trial shall resume on October 15, 1996, and continue until October 18, 1996, as necessary.

9. On June 26, 1996, Kansas provided Colorado with the opinions of its experts on Mr. Schroeder's additional proposed changes to the H-I Model. By July 12, 1996, Colorado shall provide Kansas with an update to the September 29, 1995 report by the State Engineer of Colorado setting forth any additional actions being taken by

Colorado to comply with the Arkansas River Compact since the March 30, 1996 trial segment including the approval of plans to divert tributary ground water pursuant to the Amended Rules and Regulations Governing the Diversion and Use of Tributary Ground Water in the Arkansas River Basin, Colorado, being developed or used by entities within Colorado, and any additional data collection, monitoring, and enforcement activities. By August 19, 1996, Kansas shall provide Colorado with expert reports, computer files and exhibits concerning the evidence which Kansas proposes to present during the September 30 trial segment, concerning Kansas' response to the current Colorado compliance efforts.

By September 6, 1996, Kansas shall also provide Colorado with the reports of its experts, together with any computer files and exhibits, of the testimony which it proposes to present concerning rebuttal on the 1986-94 quantification (other than evidence which Kansas proposes to present concerning Mr. Schroeder's additional proposed changes to the H-I Model, which were provided on June 26, 1996). By September 18, 1996, Colorado shall provide Kansas with any reports of its experts, together with computer files and exhibits, of any testimony which it proposes, if allowed by the Special Master, to present concerning any surrebuttal on the 1986-94 quantifications. Both states will use best efforts to avoid the need for depositions on rebuttal and surrebuttal testimony. If depositions are necessary, they will be scheduled at the

beginning of or during trial as approved by the Special Master.

DATED: July 10, 1996.

/s/ Arthur L. Littleworth
ARTHUR L. LITTLEWORTH
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business address is Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502.

I am readily familiar with Best, Best & Krieger's practice for collecting and processing correspondence for mailing with the United States Postal Service. Under that practice, all correspondence is deposited with the United States Postal Service the same day it is collected and processed in the ordinary course of business.

On July 10, 1996, I served the within MODIFICATION OF APRIL 26, 1996 ORDER RE TRIAL PROCEEDINGS by placing a copy of the document in a separate envelope for each addressee named below and addressed to each such addressee as follows:

John B. Draper, Esq.
Montgomery & Andrews
325 Paseo de Peralta
P.O. Box 2307
Santa Fe, New Mexico 87504-2307

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Washington D.C. 20530

Andrew F. Walch, Esq.
James J. DuBois, Esq.
U.S. Department of Justice
General Litigation Section
999 18th Street, Suite 945
Denver, Colorado 80202

On July 10, 1996, at the office of Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502, I sealed and placed each envelope for collection and deposit by Best, Best & Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on July 10, 1996, at Riverside, California.

/s/ Sandra L. Simmons
Sandra L. Simmons

APPENDIX – Exhibit 6

Stipulation re Depletions to Usable Stateline Flow
for 1950-85, filed October 30, 1995

IN THE SUPREME COURT OF THE UNITED STATES
No. 105, Original
October Term 1985

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

and

UNITED STATES OF AMERICA,

Defendant-Intervenor.

STIPULATION
RE DEPLETIONS TO USABLE STATELINE
FLOW FOR 1950-85

(Filed Oct. 30, 1995)

The State of Kansas and the State of Colorado stipulate and agree, subject to approval by the Special Master, as follows:

1. This Stipulation is made as a compromise between Kansas and Colorado for the complete and final settlement of the amount of depletions to usable Stateline flow caused by post-compact well pumping in Colorado for the period 1950-85.

2. Depletions to usable Stateline flow caused by post-compact well pumping in Colorado for the period

1950-85 have been determined using the Kansas Hydrologic-Institutional (H-I) Model, using the Durbin usable flow method with the Larson coefficients. Kansas and Colorado have agreed to joint exhibits which set forth the amounts of the depletions and accretions predicted by the Kansas H-I Model, using the Durbin usable flow method with the Larson coefficients, for the period 1950-85.

3. To avoid the necessity for further trial and as a compromise and settlement of their differences with respect to whether or not accretions to usable Stateline flow should offset depletions to usable Stateline flow, Kansas and Colorado have agreed that in calculating depletions to usable Stateline flow for the period 1950-85 with the Kansas H-I Model, using the Durbin usable flow method with the Larson coefficients, accretions to usable Stateline flow predicted by the Kansas H-I Model should be allowed to offset depletions to usable Stateline flow during the same season (November through March and April through October), but not otherwise.

4. The depletions to usable Stateline flow caused by post-compact well pumping in Colorado for the period 1950-85 calculated in accordance with this Stipulation are 328,505 acre-feet, as shown on Joint Exhibit 178.

5. Kansas and Colorado have agreed to this Stipulation with the understanding that neither State will be precluded from arguing that accretions to usable Stateline flow predicted by the Kansas H-I Model in years after 1985 should or should not offset depletions to usable Stateline flow in years after 1985, and with the understanding that this Stipulation shall be given no weight by

the Court in determining whether or to what extent accretions may be offset against depletions for years after 1985.

Respectfully submitted this 30th day of October, 1995.

STATE OF KANSAS

/s/ John B. Draper
JOHN B. DRAPER
Counsel of Record

MONTGOMERY & ANDREWS
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P.O. Box 2307
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Attorneys for the State of Kansas

STATE OF COLORADO

/s/ David W. Robbins
DAVID W. ROBBINS
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Telephone: 303-296-8100

Attorneys for the State
of Colorado

APPROVED:

/s/ Arthur L. Littleworth
Arthur L. Littleworth
Special Master

APPENDIX – Exhibit 7

Stipulation re Pumping in Colorado for 1986-94,
filed October 1, 1996

NO. 105, ORIGINAL

In The
SUPREME COURT OF THE UNITED STATES
October Term, 1995

STATE OF KANSAS, Plaintiff

v.

STATE OF COLORADO

STIPULATION RE PUMPING IN COLORADO FOR 1986-94

(Filed Oct. 1, 1996)

The State of Kansas and the State of Colorado stipulate and agree, subject to approval by the Special Master, as follows:

1. This Stipulation is made as a compromise between Kansas and Colorado on the amount of well pumping in Colorado, in the area modeled by the Kansas H-I Model, to be used for the purpose of quantifying depletions to usable stateline flow for the period of 1986-94.

2. For the purpose of quantifying depletions of usable stateline flow, Kansas and Colorado have agreed to use the pumping estimates developed by the Colorado experts for the period 1986-94 and agree that Kan. Exh. 787, showing the depletions and accretions for the period 1986-94 predicted by the Kansas March 1996 version of the H-I Model using the pumping estimates developed by the Colorado experts, should be admitted into evidence.

3. Kansas and Colorado do not agree on the appropriate version of the Kansas H-I Model which should be used to determine depletions to usable stateline flow for the period of 1986-94 and have agreed to this Stipulation with the understanding that neither State will be precluded from arguing which version of the model is appropriate to determine depletions to usable stateline flow for the period 1986-94.

4. While Kansas has agreed to use the pumping estimates developed by the Colorado experts for the period 1986-94 as a compromise for the purpose of quantifying depletions of usable stateline flow, Kansas does not accede to the methodology used to develop those estimates and does not accede to any implication for other periods of time.

Respectfully submitted this 1st day of October, 1996.

STATE OF KANSAS

/s/ John B. Draper
John B. Draper
Counsel of Record
Special Assistant Attorney General
Montgomery & Andrews, P.A.
Post Office Box 2307
Santa Fe, New Mexico 87504-2307
(505) 982-3873

STATE OF COLORADO

/s/ David W. Robbins
David W. Robbins
Special Assistant Attorney General
Counsel of Record

Dennis M. Montgomery
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(303) 296-8100

Attorneys for the State of Colorado

Approved:

/s/ Arthur L. Littleworth
Arthur L. Littleworth
Special Master

APPENDIX – Exhibit 8

Franzoy's Table 1 of Kansas Exhibit 801

PRIVILEGED AND CONFIDENTIAL COMMUNICATION
ATTORNEY WORK PRODUCT

KANSAS v. COLORADO
Arkansas River Valley
Table 1. Maximum Irrigation Efficiency
05-Sep-96
irref996.wb2

CANAL NAME	IRRIGATED ACREAGE 1980	EST. MAX. EFF. (1) %	DOMINANT SLOPE (2) %	EST. MAX. EFF. (3) %	EST. T.W. REUSE (6) %	ADJ. FOR T.W. REUSE %	MAX. SYST. EFF. %
Bessemer	19,130	55	0.5 - 1.0	35 - 50	10-15	5	60
Booth-Orchard	1,160	n/a			n/a	n/a	n/a
Excelsior (Sprinkler)	1,940	80	0 - 1.0	65 - 85	0	0	80
Excelsior (Gravity)	See Note (4)	55	0 - 1.0	35 - 50	<5	0	55
Collier	770	n/a	n/a	n/a	n/a	n/a	n/a
Colorado	35,300	55	0.5 - 1.0	35 - 50	<10	0	55
Rocky Ford Highline	22,730	55	0.5 - 1.0	35 - 50	10-15	5	60
Oxford Farmers	4,450	55	0.5 - 1.0	35 - 50	10-15	5	60
Otero	5,060	55	0.5 - 1.0	35 - 50	<5	0	55
Holbrook	14,520	50	0.5 - 1.5	35 - 50	5-10	5	55
Catlin	16,430	50	0.5 - 1.5	35 - 50	5-10	5	55
Rocky Ford	7,820	50	0.5 - 1.5	35 - 50	<5	0	50
Ft. Lyon	94,030	55	0,5 - 1.0	35 - 50	33-50	10	65
Baldwin-Stubbs	1,520	n/a	n/a	n/a	n/a	n/a	n/a
Las Animas	7,820	60	0 - 1.0	35 - 50	<5	0	60
Ft. Bent	5,880	65	0 - 1.0	35 - 50	<5	0	65
Keesee	1,950	65	0 - 1.0	35 - 50	<5	0	65
Amity	40,350	55	0.5 - 1.5	35 - 50	25-33	10	65
Lamar	5,080	70	0 - 1.0	50 - 70	<5	0	70
Hyde	1,610	n/a	0 - 1.0	35 - 50	n/a	n/a	n/a
Manvel	4,360	70	0 - 1.0	50 - 70	<5	0	70
XY-Graham	7,710	60	0 - 1.0	35 - 50	<5	0	60
Buffalo	7,380	60	0.5 - 1.5	35 - 50	<5	0	60
Sisson	540	65	1 - 1.0	35 - 50	<5	0	65
Other-Pueblo (5)	620	n/a	n/a	n/a	n/a	n/a	n/a
Other-Crowley (5)	0	n/a	n/a	n/a	n/a	n/a	n/a
Other-Otero (5)	510	n/a	n/a	n/a	n/a	n/a	n/a
Other-Bent (5)	400	n/a	n/a	n/a	n/a	n/a	n/a
Other-Prowers-Sprinkler (5	9,530	80	1.0 - 3.0	65 - 85	0	0	80
Other-Prowers-Gravity (5)	See Note (4)	50	1.0 - 3.0	35 - 50	n/a		50
TOTAL	318,600						
AREA SURVEYED	312,010						
AVERAGE (7)		56					52

NOTES:
(1) Efficiency estimates by C. Eugene Franzoy, P.E. based on field trip January 3-4, 1996.
(2) Dominant slope based on review of Soil Conservation Service soil surveys.
(3) Efficiency based on Soil Conservation Service data sheet for graded furrow and sprinkler.
(4) Area contains a mix of sprinkler and gravity irrigation. The acreage of each method not available.
(5) Area outside of canal system.
(6) Tailwater reuse estimate by C. Eugene Franzoy, P.E. based on field trip April 23-24, 1996.
(7) The average is determined by multiplying the efficiency by the acreage the canal system serves, totalling the multiplied values and dividing by the sum of the canal system acreages.

APPENDIX - EXHIBIT 8

APPENDIX – Exhibit 9

Stipulation re Offset Account in John Martin Reservoir, filed April 3, 1997, and Arkansas River Compact Administration Resolution

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant, and UNITED STATES OF AMERICA, Defendant-Intervenor.	)	No. 105, Original October Term 1996

STIPULATION
RE OFFSET ACCOUNT IN
JOHN MARTIN RESERVOIR

(Filed Apr. 03, 1997)

This Stipulation is entered into this 17th day of March, 1997, by the State of Kansas [hereinafter "Kansas"] and the State of Colorado [hereinafter "Colorado"], subject to approval by the Special Master of the United States Supreme Court.

RECITALS:

WHEREAS, Article IV-D of the Arkansas River Compact provides as follows:

> This Compact is not intended to impede or prevent future beneficial development of the Arkansas River basin in Colorado and Kansas by Federal or State agencies, by private enterprise, or by combinations thereof, which may involve construction of dams, reservoirs and

other works for the purposes of water utilization and control, as well as the improved or prolonged functioning of existing works: Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction;

and

WHEREAS, the United States Supreme Court has determined that post-Compact well pumping in Colorado has caused material depletions of the usable Stateline flows of the Arkansas River in violation of the Arkansas River Compact [hereinafter the "Compact"], *Kansas v. Colorado*, 115 S.Ct. 1733 (1995); and

WHEREAS, Colorado desires to continue to allow ground water pumping by its water users in excess of the pre-Compact entitlement of 15,000 acre-feet per year determined by the United States Supreme Court as long as any depletions to usable Stateline flows caused by such pumping are replaced; and

WHEREAS, the issue of Compact compliance by Colorado is presently pending before the Special Master appointed by the United States Supreme Court; and

WHEREAS, an account in John Martin Reservoir [hereinafter the "Reservoir"] is not necessary for Colorado's compliance with the Compact, but an account would be of benefit to Colorado by facilitating compliance with the Compact by Colorado and its water users to the extent that Colorado allows post-Compact well pumping by its water users in excess of the pre-Compact

pumping entitlement of 15,000 acre-feet per year, and Colorado has requested such an account; and

WHEREAS, the Arkansas River Compact Administration [hereinafter the "Administration"] has the authority to create the Offset Account as provided for in the Resolution Concerning an Offset Account in John Martin Reservoir for Colorado Pumping [hereinafter the "Resolution"], but neither the Administration nor either of its member states has any obligation to create the Offset Account; and

WHEREAS, the Offset Account will create benefits for water users in Kansas but also monitoring and accounting burdens for Kansas; and

WHEREAS, the existence of an account in the Reservoir does not, in and of itself, assure Colorado's compliance with the Compact; and

WHEREAS, the Administration and the Chief of Engineers of the Army Corps of Engineers are jointly approving concurrently herewith the Resolution establishing a new storage account in the Reservoir known as the "Offset Account in John Martin Reservoir for Colorado Pumping" [hereinafter the "Offset Account"]; and

WHEREAS, Kansas and Colorado desire to reach an agreement on the credit which Colorado shall receive for the delivery of water released from the Offset Account upon demand by Kansas, subject to approval by the Special Master of the United States Supreme Court;

NOW, THEREFORE, Kansas and Colorado stipulate and agree as follows:

1. In accordance with the Resolution, the Colorado State Engineer shall determine the extent to which water delivered to the Offset Account is fully consumable. Colorado understands that Kansas may not agree with the Colorado State Engineer's determination and agrees that the Colorado State Engineer's determination shall not be binding on Kansas in the event of a disagreement. However, both States recognize that it is useful to have the Colorado State Engineer make the determination in the first instance. In the event that Kansas disagrees with the Colorado State Engineer's determination of the extent to which water is fully consumable, Kansas shall notify Colorado within a reasonable period of time and the States shall make a good-faith attempt to resolve the disagreement. In the event the disagreement cannot be resolved by the States, Colorado agrees that it shall have the burden to establish the extent to which water delivered to the Offset Account is fully consumable.

2. With regard to water delivered to the Offset Account for the purpose of offsetting depletions to usable Stateline flows, which is released at the demand of Kansas pursuant to the Resolution, Colorado shall receive credit for the delivery of such water at the Stateline (less transit losses determined in accordance with paragraph 3 below) as a replacement of depletions to usable Stateline flows which occur after the effective date of the Resolution to the extent such water is fully consumable; provided, however, that a demand for a release of water from the Offset Account by Kansas shall not constitute an admission by Kansas that the water released from the Offset Account and delivered to the Stateline was in fact fully consumable. Antecedent flows at the Stateline shall

not be included in the calculated delivery. To the extent the credit for the delivery of water at the Stateline to offset depletions to usable Stateline flows exceeds calculated depletions to usable Stateline flows which occurred after the date of the Resolution, the credit shall be applied to reduce future depletions to usable Stateline flows. Colorado shall receive no credit, however, for spills of water from the Offset Account or for releases of Storage Charge Water (as defined in the Resolution) or Stateline Return Flow (as defined in the Resolution) as a replacement of depletions to usable Stateline flows.

3. Transit losses on releases of water from the Offset Account for delivery to the Stateline for the purpose of offsetting depletions to usable Stateline flows shall be determined using the transit losses for Subreach 6, including bank and channel storage, as set forth in the U.S. Geological Survey Water Resources Investigations 78-75, unless the States agree to use a different method or the United States Supreme Court directs otherwise. The States agree to cooperate with each other, the Administration, and the U.S. Geological Survey to improve the method of determining transit losses between John Martin Dam and the Stateline. Transit losses on releases from the Offset Account for delivery to the Stateline for the purpose of offsetting depletions to usable Stateline flow shall be borne by such releases.

4. Colorado acknowledges that use of the Offset Account may result in additional monitoring costs to Kansas. Colorado agrees that Kansas is not waiving its right to claim reasonable compensation from Colorado for such additional monitoring expenses incurred by Kansas after the effective date of the Resolution. Colorado

shall timely share relevant information with Kansas concerning use of the Offset Account in a manner that will minimize Kansas' monitoring costs. Each year, the States shall discuss further ways to minimize such costs.

5. Neither the adoption of the Resolution nor the establishment or operation of the Offset Account shall constitute a waiver of either State's rights under the Compact (if such a waiver is possible as a matter of law) or prejudice the ability of either State to represent its interests in present or future cases or controversies before the Administration or any court of competent jurisdiction; except that actual storage of water in the Offset Account, transfers authorized by the Resolution, and credits for deliveries of water to the Stateline in accordance with this Stipulation shall be considered in determining Colorado's Compact compliance; and provided further that Colorado shall receive credit for the delivery of water at the Stateline as a replacement of depletions to usable Stateline flows in accordance with this Stipulation.

DATED, this 17 day of March, 1997.

STATE OF KANSAS

/s/ John B. Draper
JOHN B. DRAPER
Counsel of Record
Special Assistant Attorney General

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STATE OF COLORADO

/s/ David W. Robbins
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Telephone: 303-296-8100

Attorneys for the State of Colorado

APPROVED:

/s/ Arthur L. Littleworth
Arthur L. Littleworth
Special Master

RESOLUTION CONCERNING AN OFFSET ACCOUNT IN JOHN MARTIN RESERVOIR FOR COLORADO PUMPING

WHEREAS, Article IV-D of the Arkansas River Compact provides as follows:

> The Compact is not intended to impede or prevent future beneficial development of the Arkansas River basin in Colorado and Kansas by Federal or State agencies, by private enterprise, or by combinations thereof, which may involve construction of dams, reservoirs and other works for the purposes of water utilization and control, as well as the improved or prolonged functioning of existing works: Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction;

and

WHEREAS, the United States Supreme Court has determined that post-Compact well pumping in the State of Colorado has caused material depletions of usable Stateline flows of the Arkansas River in violation of the Arkansas River Compact [hereinafter the "Compact"], *Kansas v. Colorado*, 115 S.Ct. 1733 (1995); and

WHEREAS, the State of Colorado [hereinafter "Colorado"] desires to continue to allow ground water pumping by its water users in excess of the pre-Compact pumping entitlement of 15,000 acre-feet per year determined by the United States Supreme Court as long as any

depletions to usable Stateline flows caused by such pumping are replaced; and

WHEREAS, Section 2 of the Act of Congress approving the Compact provides in relevant part as follows:

> [T]he Chief of Engineers is hereby authorized to operate the conservation features of the John Martin Reservoir Project in a manner conforming to such Compact with such exceptions as he and the Administration created pursuant to the Compact may jointly approve[;]

and

WHEREAS, the issue of Compact compliance by Colorado is presently pending before the Special Master appointed by the United States Supreme Court; and

WHEREAS, an account in John Martin Reservoir [hereinafter the "Reservoir"] is not necessary for Colorado's compliance with the Compact, but an account would be of benefit to Colorado by facilitating compliance with the Compact by Colorado and its water users to the extent that Colorado allows post-Compact well pumping by its water users in excess of the pre-Compact entitlement of 15,000 acre-feet per year, and Colorado has requested such an account

WHEREAS, the Offset Account [as hereinafter defined] would create benefits for water users in Kansas but also monitoring and accounting burdens for the State of Kansas [hereinafter "Kansas"]; and

WHEREAS, the existence of an account in the Reservoir does not, in and of itself, assure compliance with the Compact by Colorado and its water users; and

WHEREAS, the Arkansas River Compact Administration [hereinafter the "Administration"] recognizes that it has the authority to create the Offset Account as provided for herein, but that neither the Administration nor either of its member states has any obligation to create the account provided for in this Resolution; and

WHEREAS, concurrently with the adoption of this Resolution, Colorado and Kansas are entering into a Stipulation Re Offset Account in John Martin Reservoir [hereinafter the "Stipulation"];

NOW THEREFORE, BE IT RESOLVED that, pursuant to Section 2 of the Act of Congress approving the Compact, the Administration and the Chief of Engineers of the Corps of Engineers or his duly authorized representative, jointly approve a storage account in the Reservoir to be established and operated as follows:

1. There is hereby established a new storage account in the Reservoir to be known as the "Offset Account in John Martin Reservoir for Colorado Pumping" [hereinafter the "Offset Account"]. The size of the Offset Account shall be 20,000 acre-feet. Deliveries of water to the Offset Account shall be stored in the conservation pool but shall not be inflows into the Reservoir which accrue to conservation storage, and water in the Offset Account shall reside below elevation 3,851 feet above mean sea level (bottom of flood control storage). The establishment of the Offset Account is for the primary purpose of facilitating Compact compliance by Colorado and its water users after the effective date of this Resolution and is not for the purpose of repayment for violations of the Compact by Colorado prior to the effective

date of this Resolution or replacement to Colorado ditches except as authorized herein. The intent of this Resolution is that, to the extent that Colorado allows post-Compact well pumping in Colorado in excess of the pre-Compact entitlement of 15,000 acre-feet per year, any depletions to usable Stateline flows caused by such pumping be contemporaneously offset by delivering replacement water to the Stateline or by making replacement water available in the Offset Account where it can be called for by Kansas in accordance with this Resolution.

2. The Offset Account shall be separate from and in addition to the accounts established by the Administration's Resolution Concerning an Operating Plan for John Martin Reservoir as revised through December 11, 1984 [hereinafter the "1980 Operating Plan"] and the John Martin Reservoir Permanent Pool authorized by the Administration Resolution of August 14, 1976 [hereinafter the "Permanent Pool"].

3. The Colorado State Engineer or his delegate [hereinafter the "Colorado State Engineer"] may deliver or permit the delivery by Colorado water users of water to the Offset Account upon timely notice to the Kansas Chief Engineer or his delegate [hereinafter "Kansas Chief Engineer"]. Such notice shall specify and document the following: the source of the water delivered, the amount of water, the purpose for which the water is delivered, the time of delivery, the rate of delivery, the extent to which the water is fully consumable, and the quantity, timing, and location of any associated return flows.

4. Only water approved for storage in the Offset Account by the Colorado State Engineer may be delivered to the Offset Account, provided that adequate transit losses shall be charged during delivery of water to the Offset Account, which losses shall be determined by the Colorado State Engineer using the method set out in the U.S. Geological Survey Water Resources Investigations 78-75 (Sept. 1978) [hereinafter the "Livingston Formula". At the time of deliver of water to the Offset Account, the Colorado State Engineer shall determine the extent to which water delivered to the Offset Account is fully consumable and shall thereafter demand the release of any water necessary to maintain historical return flows to Colorado ditches and Stateline from deliveries of water historically used for agricultural irrigation; provided, however, that the Kansas Chief Engineer may, at his option, direct that water necessary to maintain historical return flows to the Stateline [hereinafter "Stateline Return Flow"] remain in the Offset Account or be transferred to the Kansas account provided for in Section II of the 1980 Operating Plan [hereinafter "Kansas Section II Account"] for later release, and provided further, that the Colorado State Engineer's determination of the extent to which water delivered to the Offset Account is fully consumable shall not be binding on the Administration or Kansas. Once the Colorado State Engineer has determined the extent to which the water delivered to the Offset Account is fully consumable or is Stateline Return Flow, and has notified the Kansas Chief Engineer in accordance with paragraph 3 above, the Kansas Chief Engineer may demand the release of the water in the Offset Account which is fully consumable at any time and at any rate and

may demand the release or direct the transfer of water in the Offset Account which is Stateline Return Flow at any time and at any rate.

5. Evaporation charges shall be made against water stored in the Offset Account in the manner set forth in Subsection II F of the 1980 Operating Plan. The evaporation charges shall be prorated amongst conservation storage and the accounts, including the offset Account, according to the amounts in them. Evaporation from water in the Offset Account shall be charged against Colorado until:

A. The water is released or transferred in accordance with this Resolution, or

B. Thirty days after the Colorado State Engineer has determined and notified the Kansas Chief Engineer of the estimated monthly net depletion to usable Stateline flows caused by post-Compact diversions of tributary ground water from the Valley Fill Aquifer and surficial aquifers along the Arkansas River between Pueblo Dam and the Stateline ("the estimated monthly net depletion of usable Stateline flows"), to the extent the Kansas Chief Engineer has not previously demanded the release of water available for replacement of the Offset Account in an amount equal to or greater than the estimated monthly net depletion to usable Stateline flows, the evaporation loss on that amount of water or portion thereof shall thereafter be charged to Kansas. In order to determine the estimated monthly net depletion to usable Stateline flows for

purposes of this paragraph only, the Colorado State Engineer shall use the following procedure unless he and the Kansas Chief Engineer agree otherwise: the Colorado State Engineer shall use the presumptive stream depletions established in Rule 4.2 of the Amended Rules and Regulations Governing the Diversion and Use of Tributary Ground Water in the Arkansas River Basin, Colorado, effective June 1, 1996 [hereinafter "Amended Rules"] and unit response functions presently utilized in accordance with the Amended Rules to determine stream depletions at the Stateline caused by post-Compact diversions of tributary ground water from the Valley Fill Aquifer and surficial aquifers along the Arkansas River between Pueblo Dam and the Stateline. Further, the Colorado State Engineer shall use the same procedures currently used under the Amended Rules to determine the timing and location of return flows from diversions of imported waters and other augmentation water in determining net stream depletions at the Stateline. For the summer storage season in the Reservoir (April 1-October 31), the Colorado State Engineer shall assume that net depletions to usable Stateline flows are 81.9 percent of the net stream depletions at the Stateline, and for the winter storage season (November 1-March 31), the Colorado State Engineer shall assume that net depletions to usable Stateline flows are 34.9 percent of the net stream depletions at the Stateline; provided that if the monthly Stateline flow exceeds 30,000 acre-feet during the summer storage

season or 7,500 acre-feet during the winter storage season, no depletion to usable Stateline flows shall be determined for such months for the purpose of this paragraph.

Notwithstanding paragraph B above, until thirty days after the Colorado State Engineer has determined and notified the Kansas Chief Engineer of the quantity and timing of any estimated Stateline Return Flow in the Offset Account, and the time for release of such water to the Stateline has passed, the evaporation loss on that amount of Stateline Return Flow shall be charged to Colorado, but shall thereafter be charged to Kansas.

6. In accordance with the provisions of paragraphs 3 and 4 above, the Colorado State Engineer may deliver or permit the delivery of water by Colorado water users to the Offset Account, in an amount not to exceed 1,500 acre-feet per Compact year, for the purpose of replacing depletions to the inflows to conservation storage caused by post-Compact well pumping in Colorado and may (1) direct the transfer of such water from the Offset Account to conservation storage to replace depletions to the inflows to conservation storage, or (2) to the extent such water is not needed to replace depletions to the inflows to conservation storage, may change the prior designation of water previously designated for the purpose of transfer to conservation storage. Once the Colorado State Engineer has notified the Kansas Chief Engineer of the change of designation, such water may be released or transferred in accordance with this Resolution.

7. Releases from the Offset Account may be made simultaneously with deliveries into the Offset Account.

However, such simultaneous releases and deliveries cannot create a deficit in the Offset Account.

8. Transit losses for releases from the Offset Account shall not be replenished from the Kansas transit loss account. Transit losses associated with the release of Stateline Return Flow from the Offset Account shall be replaced by the entity which delivered such Stateline Return Flow to the Offset Account, provided that any increase in transit losses which results if the Kansas State Engineer directs that Stateline Return Flow remain in the Offset Account and calls for the release of such Stateline Return Flow at a later time shall be borne by Kansas. Such transit losses on releases of Stateline Return Flow shall be determined using the Livingston Formula for Subreach 6, removing bank and channel storage from the calculation, unless the Colorado State Engineer and the Kansas Chief Engineer agree otherwise. In order to ensure the arrival of releases of Stateline Return Flow at the Stateline if the Kansas Chief Engineer calls for the release of such Stateline Return Flow during the summer storage season in the Reservoir (April 1-October 31), an amount of water equal to the transit losses determined using the Livingston Formula for Subreach 6, including bank and channel storage, shall be released with the Stateline Return Flow and shall be charged to the entity which delivered the Stateline Return Flow, except that Kansas shall bear any increase in evaporation resulting from the summer storage release.

9. Notwithstanding other provisions of this Resolution, 500 acre-feet of fully consumable water shall be delivered by Colorado or Colorado water users to the Offset Account by April 1 of each year or within two

weeks after this Resolution becomes effective, whichever is later, which delivery shall be a prerequisite for Colorado's right to deliver or permit the delivery by Colorado water users of up to 10,000 acre-feet of water (including the said 500 acre-feet) to the Offset Account pursuant to this Resolution during the period until the next succeeding April 1. For delivery of water to the Offset Account in excess of 10,000 acre-feet during each period, five percent of the amount delivered shall be allocated to Kansas. The said 500 acre-feet and five percent of any water delivered in excess of 10,000 acre-feet during each period [hereinafter "Storage Charge Water"] shall be allocated to Kansas, not for offset of depletions of usable flow at the Stateline but as part of Kansas' equitable share of the benefits arising from the creation of the Offset Account in the Reservoir. The Kansas Chief Engineer may direct that Storage Charge Water be transferred to the Kansas Section II Account or may demand the release of Storage Charge Water at any time and at any rate. If Storage Charge Water is retained in the Offset Account, Kansas shall bear the evaporation after April 1. Colorado water users shall bear the evaporation prior to April 1. Any shortfall due to evaporation in the 500 acre-foot April 1 delivery requirement shall be made up out of the next delivery of water after April 1 by Colorado water users. Kansas shall bear the transit losses associated with the release of Storage Charge Water. Such transit losses shall be calculated using the Livingston Formula for Subreach 6, unless the Colorado State Engineer and the Kansas Chief Engineer agree otherwise.

10. No transfers, releases or exchanges shall be made of water in the Offset Account except releases and

transfers authorized by this Resolution or approved by the Administration.

11. Not later than December 1 of each year, the Colorado State Engineer shall make an accounting of the operation under this Resolution for the previous Compact year available to the Operations Committee of the Administration and to interested parties.

12. In recognition of the fact that the operation of the Offset Account is for the primary purpose of facilitating Compact compliance by Colorado in connection with increased post-Compact pumping by Colorado water users, the Colorado State Engineer shall report to the Administration and the Kansas Chief Engineer on a monthly basis the timing and amount of deliveries to the Offset Account, the monthly pumping in location and amount in excess of Colorado's pre-Compact entitlement, and Colorado's monthly accounting of Compact compliance, including documentation not already provided and a report of the status of water delivered to the Offset Account, within two months of the end of the month reported. The Administration recognizes that use of this Offset Account to facilitate Compact compliance by Colorado after the effective date of this Resolution may result in additional monitoring costs to Kansas. The Administration recognizes that Kansas is not waiving its right to claim reasonable compensation from Colorado for such additional monitoring expenses incurred by Kansas after the effective date of this Resolution. The Colorado State Engineer shall timely share relevant information with the Kansas Chief Engineer concerning use of the Offset Account in a manner that will minimize Kansas' monitoring costs. Each year the Colorado State Engineer and the

Kansas Chief Engineer shall discuss further ways to minimize such costs.

13. In the event that runoff conditions occur in the Arkansas River basin upstream from the Reservoir that cause water to spill from the Reservoir, then water stored in the Permanent Pool in excess of 10,000 acre-feet shall spill before water stored in the accounts granted in Subsections III A, B, and C of the 1980 Operating Plan, which shall spill before the water stored in the Offset Account, which shall spill before the accounts granted in Section II of the 1980 Operating Plan, which shall spill before the Kansas Transit Loss Account, all of which shall spill before conservation storage.

14. Water available under priority rights decreed to the ditches of Colorado Water District 67 [hereinafter "District 67"] may be stored in the Offset Account only when no water is accruing to conservation storage, provided that return flows shall be maintained and accounted for in accordance with paragraphs 3 and 4 above; and water may be transferred into the Offset Account from accounts of the ditches of District 67 in the Reservoir provided for in Section II of the 1980 Operating Plan in accordance with this Resolution; provided that such storage or transfers are in accordance with the Amended Rules adopted by the Colorado State Engineer and, with respect to transfers from District 67 accounts, shall include both the consumable and return flow portions of such water.

15. Neither the adoption of this Resolution nor the establishment or operation of the Offset Account shall constitute a waiver of either State's rights under the

Compact (if such a waiver is possible as a matter of law) or prejudice the ability of either State to represent its interests in present or future cases or controversies before the Administration or any court of competent jurisdiction, except as provided in the Stipulation.

16. All terms employed in this Resolution which are defined in the Compact or the 1980 Operating Plan shall have the same meaning as set out in the Compact or the 1980 Operating Plan, as the case may be.

17. The effective date of this Resolution shall be the date on which the Chief of Engineers of the Corps of Engineers, or his duly authorized representative, gives his approval by signing and dating below in the space provided. This Resolution shall not be affected by the termination of the 1980 Operating Plan, except that operations contemplated in this Resolution which rely on the existence of the 1980 Operating Plan shall no longer occur if the 1980 Operating Plan is terminated. This Resolution shall be in full force and effect until March 31, 1998, and year-to-year thereafter subject to the following provisions:

A. Either Colorado or Kansas, through its Compact delegation, may terminate this Resolution effective March 31 by giving written notice to the Administration by February 1 of the same Compact year.

B. In the event that this Resolution is terminated, water in the Offset Account at that time may remain in storage in the Offset Account and be released or transferred as provided above until no water remains in the Offset Account, at which time the Offset Account shall be terminated.

18. Colorado may, as it sees fit, fulfill or, as a condition to delivery of water to the Offset Account by Colorado water users, require its water users to fulfill the delivery requirements and be responsible for evaporation and transit loss charges imposed on Colorado by this Resolution, provided that Colorado shall require Colorado water users who wish to deliver water to the Offset Account to comply with this Resolution in all respects and shall require immediate cessation of the use of the Offset Account by any Colorado water user or users in the event of any substantial failure by such Colorado water user or users to comply with this Resolution.

19. Any releases of water from the Offset Account shall not exceed the channel capacity as determined by the Corps of Engineers.

JOINTLY APPROVED:

/s/ Larry E. Trujillo, Sr.
Chairman
Arkansas River Compact
Administration

/s/ Don Higbee
Recording Secretary
Arkansas River
Compact
Administration

/s/ Lloyd S. Wagner
District Engineer,
Albuquerque District,
Duly Authorized
Representative of the
Chief of Engineers
U.S. Army Corps of Engineers

17 March 1997
Date

No. 105, Original

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CLERK

In The

Supreme Court of the United States

October Term, 1997

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

- UNITED STATES OF AMERICA,

Defendant-Intervenor.

COLORADO'S EXCEPTIONS TO THE SECOND REPORT OF THE SPECIAL MASTER AND BRIEF IN SUPPORT THEREOF

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STATE OF COLORADO,

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UNITED STATES OF AMERICA,

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COLORADO'S EXCEPTIONS TO THE SECOND REPORT OF THE SPECIAL MASTER

The State of Colorado respectfully files the following exceptions to the Second Report of Special Master Arthur L. Littleworth dated September 1997:

1. Colorado excepts to the Special Master's recommendation that if the remedy in this case includes money damages, the 11th Amendment to the United States Constitution does not preclude damages to the State of Kansas from being based, in part, on losses incurred by water users in Kansas.

2. Colorado excepts to the Special Master's recommendation that the unliquidated nature of Kansas' claim

for damages does not bar the award of prejudgment interest.

Respectfully submitted,

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QUESTIONS PRESENTED

1. Does the 11th Amendment to the U.S. Constitution bar the State of Kansas from recovering damages from the State of Colorado for losses sustained by individual water users in Kansas?

2. Is the State of Kansas entitled to recover prejudgment interest on unliquidated damages?

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BRIEF IN SUPPORT OF COLORADO'S EXCEPTIONS TO THE SECOND REPORT OF THE SPECIAL MASTER

The State of Colorado submits this brief in support of its exceptions to the Second Report of Arthur L. Littleworth, Special Master.

JURISDICTION

The original jurisdiction of the Court was invoked by the State of Kansas under Article III, Section 2, of the United States Constitution and 28 U.S.C. § 1251(a)(1).

STATEMENT OF THE CASE

This is an action concerning enforcement of the 1949 Arkansas River Compact, an interstate compact apportioning the waters of the Arkansas River between the States of Colorado and Kansas.[1] In the decades following adoption of the Compact, water users in both Colorado and Kansas continued to develop waters of the Arkansas River, primarily through increased well pumping. Report of Arthur L. Littleworth, Special Master (July 1994)

[1] The Compact was signed by Commissioners for Colorado and Kansas on December 14, 1948, and became effective on May 31, 1949, after it was ratified by the legislature of each state and consented to by Congress. Arkansas River Compact, Art. IX-A (printed in Appendix); Act of May 31, 1949, Ch. 155, 63 Stat. 145 (1949).

("First Report") at 113-15, 304. In 1984, Kansas complained for the first time about post-Compact well development in Colorado.[2] *Id.* at 155-56. The Arkansas River Compact Administration authorized an investigation in March 1985, but the representatives could not agree on how to conduct the investigation. *Id.*, App. 51-55.

In December 1985, Kansas filed a motion for leave to file a complaint against Colorado, which this Court granted in 1986. *Kansas v. Colorado*, 475 U.S. 1079 (1986). The case was bifurcated into a liability and a remedy phase, and trial on the liability phase began in September 1990 and concluded in December 1992. First Report at 24-25, 28. Experts for Kansas developed a computer model (the Kansas H-I Model) for the liability phase to predict diversions of water from the Arkansas River based on the Colorado priority system and crop demands, storage and release of water from reservoirs, consumption of water, return flows, and resulting stream flows along a 150-mile reach of the Arkansas River from Pueblo, Colorado, to the Colorado-Kansas Stateline. *Id.* at 229-34.

The Special Master filed his first Report with the Court in July 1994 setting forth his conclusions and recommendations on the liability issues. The Special Master recommended dismissal of Kansas' winter water storage

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[2] Kansas submitted a report to the Arkansas River Compact Administration concerning possible violations of the Arkansas River Compact caused by post-Compact well development in Colorado, the operation of a winter water storage program in Colorado, and the operation of Trinidad Reservoir. First Report at 153.

and Trinidad Reservoir claims, but found that post-Compact well pumping in Colorado had caused material depletions to usable Stateline flows in violation of the Compact, although additional evidence was necessary to quantify the amount of such depletions. First Report at 43, 263, 335-36. In its May 15, 1995 Opinion, the Court overruled all exceptions to the first Report, affirmed the Special Master's recommendations, and remanded the case to the Special Master for determination of unresolved issues in a manner not inconsistent with the Court's opinion. *Kansas v. Colorado*, 514 U.S. 675 (1995).

Following the Court's decision, the Special Master set hearings on two unresolved issues: evaluation of Colorado's efforts to comply with the Compact and quantification of depletions to usable Stateline flows caused by post-Compact well pumping in Colorado. Second Report of Arthur L. Littleworth, Special Master (September 1997) ("Second Report"), App. 1-2. He also required Kansas to file a statement of its position concerning a remedy for violations of the Compact, indicating whether Kansas sought damages in money, water, or a combination of both. *Id.*, App. 2. Over the course of several hearings, the Special Master heard testimony from the Colorado State Engineer about Colorado's efforts to comply with the Compact. The Special Master described Colorado's compliance efforts as showing "a most impressive record" and "remarkable" progress. *Id.* at 47.

At the outset of the hearing scheduled in October 1995, Colorado and Kansas stipulated to the amount of depletions for the 1950-85 period using the Kansas H-I Model as it had been revised by the Kansas replacement experts during the liability phase. Second Report at 11;

see First Report at 28-30, 236-54. It appeared that depletions for the period 1986-94 could be determined relatively easily by updating the data sets needed for the model. Second Report at 12-13. However, in the course of updating the model, the Kansas experts discovered another deficiency – a deficiency which had been pointed out by Colorado's experts during the liability phase. *Id.* at 21-23. The Kansas experts made changes to the H-I Model, which Colorado's experts criticized as selective and which had the effect of increasing predicted depletions to usable Stateline flows. *Id.* The nature of the dispute and the Special Master's recommendation on the changes to the H-I Model are set forth in the Second Report at 12-46. Although Colorado's experts believe there are deficiencies in the latest version of the H-I Model accepted by the Special Master, *id.* at 38-41, Colorado has not taken an exception to the Special Master's recommendation on depletions for the period 1986-94, preferring instead to accept the Special Master's invitation to address deficiencies directly in future proceedings. *Id.* at 37.

In accordance with the Special Master's order, Kansas filed a statement of its position regarding a remedy. Despite the difficulty in determining depletions to usable Stateline flows during this case, despite the fact that Kansas did not complain about a Compact violation until 1984, at the earliest, and despite the fact that the Special Master found that Colorado's actions were not deliberate or willful, Second Report at 77-78, Kansas is seeking money damages for depletions to usable Stateline flows dating back to 1950, including losses suffered by individual water users in Kansas and prejudgment interest.

Colorado asked the Special Master to rule on legal issues related to Kansas' claim for money damages to avoid the time and expense of preparing economic analyses premised on irrelevant damages theories, as had occurred after the Court's decision in *Texas v. New Mexico*, 482 U.S. 124 (1987), the first case to hold that money damages could be awarded as a remedy for breach of an interstate compact. *See* Second Report at 80-81. In addition, Colorado suggested that repayment of past depletions to usable Stateline flows in water rather than money might be a more equitable remedy, and that a water remedy would avoid the difficult process of attempting to determine money damages going back more than 45 years.

In his Second Report, the Special Master concludes that a suitable remedy may be in terms of money damages or water and that evidence should be received on a suitable remedy. Second Report at 72, 113 ¶6. The Special Master also concludes that if a suitable remedy in this case should include money damages, the damages should be based on Kansas' loss rather than on any gain by Colorado, subject to the overriding consideration that the remedy provide a fair and equitable solution. *Id.* at 75-84, 113 ¶7. However, the Special Master concludes that if the remedy includes money damages, the 11th Amendment does not preclude damages to Kansas from being based, in part, on losses incurred by its water users, subject to overall considerations of fairness. *Id.* at 85-104, 113 ¶8. Finally, the Special Master concludes that, whether the remedy includes money damages or repayment in water, the unliquidated nature of Kansas' claim does not bar an award of prejudgment interest and that the possible

award of prejudgment interest will depend upon future trial proceedings. *Id.* at 105-11, 113-14 ¶9.

Colorado takes exception to these last two recommendations.

SUMMARY OF ARGUMENT

The Special Master has decided two important issues of law applicable to controversies between states in a manner inconsistent with this Court's precedents and policy.

First, the Special Master disregards this Court's decisions on the nature of quasi-sovereignty and the protection afforded to states by the 11th Amendment, and recommends that if the remedy in this case includes money damages, Kansas may recover damages from Colorado for losses suffered by individual water users in Kansas. This is directly contrary to the Court's decision in *North Dakota v. Minnesota*, 263 U.S. 365 (1923), and is unsupported by any of the Court's cases.

Second, relying on a recent case in admiralty law, the Special Master declines to follow the common-law rule that prejudgment interest will not be awarded on unliquidated damages, and has determined that prejudgment interest is not precluded here. This case involves a good-faith dispute over the effects of well pumping on the flows at the Colorado-Kansas Stateline, effects which were not readily apparent, and of which Kansas did not

complain until 35 years after the first injury occurred. It is therefore a particularly inappropriate case for abandoning the traditional rule disallowing prejudgment interest on unliquidated damages.

Finally, both of the Special Master's determinations will have undesirable broader consequences. The Special Master's expansion of the concept of quasi-sovereignty will lead to confusion and increase the risk of double recoveries in other cases where a state represents its quasi-sovereign interests. Further, the unprecedented and unanticipated expansion of liability for breach of an interstate compact will discourage states from resolving their differences through interstate compacts and will encourage litigation between states in this Court.

ARGUMENT

I. THE 11TH AMENDMENT DOES NOT ALLOW KANSAS TO RECOVER DAMAGES FROM COLORADO FOR LOSSES SUFFERED BY INDIVIDUAL WATER USERS IN KANSAS

The issue in this case is whether, in an original action by one state against another for violation of an interstate compact apportioning the waters of an interstate river, the 11th Amendment permits the plaintiff state to recover damages from the defendant state for losses suffered by individual water users in the plaintiff state. This Court has understood the 11th Amendment "to stand not so much for what it says, but for the presupposition which it confirms;" namely, that "federal jurisdiction over suits against unconsenting States 'was not contemplated by the

Constitution when establishing the judicial power of the United States.' " *Seminole Tribe of Florida v. Florida*, 517 U.S. 609, ___, 116 S.Ct. 1114, 1122, 134 L.Ed.2d 252, 265 (1996), *quoting Blatchford v. Native Village of Noatak*, 501 U.S. 775, 779 (1991), and *Hans v. Louisiana*, 134 U.S. 1, 15 (1890).[3] On the other hand, there is no dispute that the framers of the Constitution intended that this Court would have original jurisdiction over controversies between states and that there would be a surrender of state sovereign immunity to such actions. *Principality of Monaco v. Mississippi*, 292 U.S. 313, 328 (1934); *The Federalist*, No. 80, No. 81.

As the Special Master recognizes, this Court's decisions make it clear that if Kansas were suing to recover damages which would be directly turned over to its citizens, the claim would be barred by the 11th Amendment. *E.g., North Dakota v. Minnesota*, 263 U.S. 365 (1923); *New Hampshire v. Louisiana*, 108 U.S. 76 (1883); Second Report at 90-91, 95. The Special Master distinguishes such cases on the basis that the recovery in this instance would not go to the individuals, but instead would be paid to Kansas. *Id.* at 88-89. In Colorado's view, the Special Master's conclusion circumvents the constitutional limitation placed on federal jurisdiction by the 11th Amendment

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[3] The 11th Amendment states:

> The Judicial power of the United States shall not be construed to extend to any suit in law or equity, commenced or prosecuted against one of the United States by Citizens of another State, or by Citizens or Subjects of any Foreign State.

and is based on a theory of sovereign trusteeship that has been rejected in other cases.

A. THE FACT THAT KANSAS HAS A RIGHT TO SEEK RELIEF FOR INJURY TO ITS QUASI-SOVEREIGN INTERESTS DOES NOT GIVE IT THE RIGHT TO PRESENT AND ENFORCE INDIVIDUAL CLAIMS OF ITS CITIZENS.

Colorado recognizes that the Court has broad power to fashion a fair and equitable remedy between the signatory states for past violations of the Arkansas River Compact; however, that power must be exercised within the limits imposed by the Constitution. Allowing Kansas to recover losses sustained by individual farmers, as the Special Master recommends, Second Report at 103, would circumvent the 11th Amendment and greatly expand the concept of quasi-sovereignty.

It is well-settled that, in a case such as this, a state's quasi-sovereign interests are sufficient to support jurisdiction and the issuance of injunctive relief. The interests which Kansas is empowered to represent in this action, however, are independent of the interests of individual citizens. *See, e.g., Kansas v. Colorado*, 206 U.S. 46, 99 (1907); *Georgia v. Tennessee Copper Co.*, 206 U.S. 230, 237 (1907).

A state's right to represent its quasi-sovereign interests in a controversy between states does not allow a state to make claims on behalf of individual citizens. This has been clear since *New Hampshire v. Louisiana*, 108 U.S. 76 (1883), where citizens of New Hampshire assigned their claims on bonds issued by the State of Louisiana to the

State of New Hampshire for collection. The Court recognized in that case that the 11th Amendment prevented the citizens who owned bonds from bringing suit on their own behalf against the State of Louisiana. 108 U.S. at 88. Therefore, the Court said, "the real question" was "whether a state can allow the use of its name in such a suit for the benefit of one of its citizens." *Id.* First, the Court rejected the argument that a state could prosecute such suits as sovereign trustee of its citizens. *Id.* at 89-90. Second, the Court rejected the argument that the Constitution granted states the right to prosecute the claims of their citizens in the federal courts:

> The evident purpose of the [11th] Amendment, so promptly proposed and finally adopted, was to prohibit all suits against a State by or for citizens of other States, or aliens, without the consent of the State to be sued and, in our opinion, one State cannot create a controversy with another State, within the meaning of that term as used in the judicial clauses of the Constitution, by assuming the prosecution of debts owing by the other State to its citizens. *Such being the case, we are satisfied that we are prohibited, both by the letter and the spirit of the Constitution, from entertaining these suits, and the bill in each of them is, consequently, dismissed.*

108 U.S. at 91 (emphasis in original).

These principles were further developed in *North Dakota v. Minnesota*, 263 U.S. 365 (1923), where a claim for damages for losses to individuals was coupled with a permissible claim by a state for injury to its quasi-sovereign interests. There, North Dakota sought both an

injunction and damages for flooding allegedly caused by drainage ditches in Minnesota. The Court found that North Dakota could seek an injunction against operation of the Minnesota ditches:

> [W]here one state by a change in its method of draining water from lands within its border increases the flow into an interstate stream, so that its natural capacity is greatly exceeded and the water is thrown upon the farms of another state, the latter state *has such an interest as quasi sovereign in the comfort, health, and prosperity of her farm owners* that resort may be had to this court for relief. It is the creation of a public nuisance of simple type *for which a state may properly ask an injunction.*

Id. at 374 (emphasis added). However, the Court held that North Dakota could not recover damages for losses to its inhabitants whose farms were flooded and whose crops were lost:

> North Dakota, in addition to an injunction, seeks a decree against Minnesota for damages of $5,000 for itself and of $1,000,000 for its inhabitants whose farms were injured and whose crops were lost. It is difficult to see how we can grant a decree in favor of North Dakota for the benefit of individuals against the state of Minnesota in view of the Eleventh Amendment to the Constitution, which forbids the extension of the judicial power of the United States to any suit in law or equity prosecuted against any one of the United States by citizens of another state or by citizens and subjects of a foreign state.

> . . . *The right of a state as parens patriae to bring suit to protect the general comfort, health, or property rights of its inhabitants threatened by the proposed or continued action of another state by prayer for injunction is to be differentiated from its lost power as a sovereign to present and enforce individual claims of its citizens as their trustee against a sister state.* For this reason the prayer for a money decree for the damage done by the floods of 1915 and 1916 to the farms of individuals in the Bois de Sioux valley is denied for lack of jurisdiction.

Id. at 374-76 (emphasis added).[4]

The Court has repeatedly reaffirmed the distinction between proper *parens patriae* actions by states to vindicate quasi-sovereign interests and improper attempts by states to recover on claims of individual citizens. For example, in *Oklahoma ex rel. Johnson v. Cook*, 304 U.S. 387 (1938)[5], the Court dismissed Oklahoma's attempt to recover assets from out-of-state shareholders of an insolvent bank on behalf of depositors. Although the state had assumed control of and title to the bank's assets, the Court found that the original jurisdiction proceeding was not proper:

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[4] The Court reviewed North Dakota's request for an injunction and for $5,000 in damages to the state on the merits, and found that North Dakota had not proven that Minnesota was responsible for the flooding. 263 U.S. at 388.

[5] *Oklahoma v. Cook* dealt solely with the Court's jurisdiction over cases in which a state is a party under Art. III, § 2, cl. 2. of the U.S. Constitution and not with 11th Amendment immunity, but the nature of the state's interests is the same in either case.

> To bring a case within that jurisdiction, it is not enough that a State is plaintiff. Nor is it enough that a State has acquired the legal title to a cause of action against the defendant, where the recovery is sought for the benefit of another who is the real party in interest.

304 U.S. at 392. The Court recognized that a state could invoke its original jurisdiction to vindicate quasi-sovereign interests:

> But this principle does not go so far as to permit resort to our original jurisdiction in the name of the State but in reality for the benefit of particular individuals, albeit the State asserts an economic interest in the claims and declares their enforcement to be a matter of state policy.

304 U.S. at 394. A long line of cases recognizes this important distinction. *Alfred L. Snapp & Son, Inc. v. Puerto Rico*, 458 U.S. 592, 607 (1982); *Maryland v. Louisiana*, 451 U.S. 725, 745 n.21 (1981) ("[A]n original action between two States only violates the Eleventh Amendment if the plaintiff State is actually suing to recover for injuries to specific individuals.")[6]; *Pennsylvania v. New Jersey*, 426 U.S. 660, 665 (1976) ("[A] State has standing to sue only when its sovereign or quasi-sovereign interests are implicated and it is not merely litigating as a volunteer the personal claims of its citizens."); *Hawaii v. Standard Oil*

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[6] *Cf.* 451 U.S. at 737 ("A State is not permitted to enter a controversy as a nominal party in order to forward the claims of individual citizens. But it may act as the representative of its citizens in original actions where the injury alleged affects the general population of a state in a substantial way." (citations omitted)).

Co., 405 U.S. 251, 258 n.12 (1972) ("An action brought by one State against another violates the Eleventh Amendment if the plaintiff State is actually suing to recover for injuries to designated individuals."). To allow Kansas to recover damages for losses sustained by individual water users in Kansas would create an unprecedented expansion of the concept of quasi-sovereignty at the expense of the 11th Amendment and the principle of sovereign immunity.[7]

B. THE SPECIAL MASTER'S RECOMMENDATION IS BASED ON THE MISTAKEN ASSUMPTION THAT THE 11TH AMENDMENT IS NOT A FACTOR IN THIS CASE.

Notwithstanding the above principles, the Special Master concludes that the 11th Amendment is not a barrier to recovery of damages by Kansas for injuries suffered by individual farmers in Kansas based on the "fundamental rule" that, once the Court accepts a case between states as involving sovereignty or quasi-sovereignty, "the 11th Amendment is not a factor." Second Report at 103. This "rule" misinterprets the Court's prior decisions, which recognize that a state's complaint may raise both proper proprietary or quasi-sovereign claims and improper claims for the benefit of individuals in one

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[7] There has been no suggestion that Colorado waived its sovereign immunity to claims by individual water users for violation of the Compact. *Cf. Petty v. Tennessee-Missouri Bridge Comm'n*, 359 U.S. 275 (1950). Indeed, the premise of the Special Master's recommendation is that individual water users have no remedy.

action. For example, North Dakota raised both an improper claim for damages to individual farmers and a proper quasi-sovereign claim for injunctive relief to prevent flooding; the Court dismissed the first claim and considered the merits of the second. *North Dakota v. Minnesota*, 263 U.S. 365, 374-76 (1923). Hawaii raised an improper claim for economic damages to its citizens and a proper claim for economic damages to its proprietary interests, both based on the same monopolistic activities; the Court dismissed the first and allowed the second to proceed. *Hawaii v. Standard Oil Co.*, 405 U.S. at 262-64. The issue of jurisdiction (resolved by the Court's granting of Kansas' motion for leave to file its complaint in this case) is separate from the issue of remedies, still to be resolved. This Court's two-sentence order granting the motion for leave to file the complaint cannot be read as approving, sight unseen, any conceivable remedy Kansas might later request as part of a "proper original action."

The Special Master gives four reasons for rejecting Colorado's argument: (1) the nature of quasi-sovereignty; (2) the Court's statements in *Texas v. New Mexico*, 482 U.S. 124 (1987); (3) the Laramie River decisions, which used individual water rights as the basis for an interstate apportionment; and (4) the lack of any other remedy for Kansas water users. Second Report at 100-104. Colorado will deal with each of them in turn.

The Special Master first states that Colorado's argument is inconsistent with the basic concept of quasi-sovereignty because "[q]uasi-sovereignty throws the mantle of the state itself over the area and people involved in order *to permit a general recovery for them*, albeit the recovery is payable to the state itself." Second

Report at 101 (emphasis added). This misapprehends the nature of quasi-sovereignty. This Court has made it clear that the concept "does not involve the State stepping in to represent the interests of particular citizens who, for whatever reason, cannot represent themselves." *Alfred L. Snapp & Son, Inc. v. Puerto Rico*, 458 U.S. 592, 600 (1982)[8]; *North Dakota v. Minnesota*, 263 U.S. at 376. Rather, to have *parens patriae* standing, the state must assert injury to its quasi-sovereign interests, *Snapp*, 458 U.S. at 601, which have consistently been described as "apart from the interests of particular private parties," *id.* at 607, "apart from that of the individuals affected," *Pennsylvania v. West Virginia*, 262 U.S. 553, 592 (1923), and "independent of and behind the titles of [a state's] citizens." *Snapp*, 458 U.S. at 604, *quoting Georgia v. Tennessee Copper Co.*, 206 U.S. 230, 237 (1907).[9]

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[8] *Snapp* involved the question of a state (or commonwealth's) standing to bring a *parens patriae* action in federal district court. The Court recognized that "a more circumspect inquiry may be required" into such an issue in original jurisdiction cases between states, to ensure that the 11th Amendment was not "too easily circumvented." 458 U.S. at 611 (Brennan, J., concurring); *see also id.* at 603 n.12.

[9] The nature of the concept of *parens patriae* and the distinction between damages to the state's *parens patriae* interest and citizens' individual rights is discussed in two excellent law review articles, Michael Malina & Michael D. Blechman, *Parens Patriae Suits for Treble Damages Under the Antitrust Laws*, 65 N.W.U.L.Rev. 193 (1970), and *State Protection of Its Economy and Environment*, 6 Colum.J.L. & Soc. Probs. 411 (1970), both of which are cited in *Hawaii v. Standard Oil Co.*, 405 U.S. at 257. Both articles persuasively demonstrate that a state's *parens patriae* interest is separate from the individual rights of its citizens, although quantification of damages to the state's quasi-sovereign interest may be difficult.

The interest which Kansas represents in this action is its quasi-sovereign "interest as a state in this large tract of land bordering on the Arkansas river. Its prosperity affects the general welfare of the state." *Kansas v. Colorado*, 206 U.S. 46, 99 (1907). A state's right to present its quasi-sovereign interest is distinct from its foregone sovereign right to present its citizens' individual claims as assignee or trustee. *Oklahoma ex rel. Johnson v. Cook*, 304 U.S. at 392-93; *North Dakota v. Minnesota*, 263 U.S. at 374-76; *New Hampshire v. Louisiana*, 108 U.S. at 91. Interpreting quasi-sovereignty to allow Kansas to recover for losses to individual farmers in Kansas would eliminate the distinction drawn by the Court between allowable quasi-sovereign representation and improper sovereign trusteeship.

The Special Master's unprecedented definition of quasi-sovereignty also ignores the difference between injunctive relief and damages. The overwhelming majority of this Court's decisions on quasi-sovereignty have concerned claims for injunctive relief. As this Court has noted, "[O]ne injunction is as effective as 100; . . . 100 injunctions are no more effective than one." *Hawaii v. Standard Oil Co.*, 405 U.S. at 261. The fact that this Court has approved injunctions to vindicate states' quasi-sovereign interests which also may have benefited private individuals does not support stretching the mantle of quasi-sovereignty to include recovery of damages for injuries to private individuals.

Second, the Special Master states that "the key case on this subject, *Texas v. New Mexico*, 482 U.S. 124 (1987), speaks broadly of providing a remedy for past breaches [of an interstate compact]." Second Report at 101. The

Special Master also relies heavily on the Court's statement in *Texas v. New Mexico* that, "[i]n *proper* original actions, the Eleventh Amendment is no barrier, for by its terms, it applies only to suits by citizens against a State." Second Report at 102, *quoting Texas v. New Mexico*, 482 U.S. at 130 (emphasis added). That case, however, simply determined for the first time that money damages could be awarded as a remedy for past breaches of an interstate compact. The Court's ruling that money damages could be awarded as a remedy did not address the particular elements which could be included in the calculation of such damages; that was left to the special master in that case to determine, *id.* at 132, and was ultimately resolved by a consent decree. *Texas v. New Mexico*, 494 U.S. 111 (1990). The Court's broad statement of its "complete judicial power" to resolve disputes among the states under the Constitution must therefore be read in light of its continuing recognition that the 11th Amendment limits the grant of judicial power under Article III of the Constitution. *Idaho v. Coeur d'Alene Tribe*, ___U.S. ___, ___, 117 S.Ct. 2028, 2033, 138 L.Ed.2d 438, 447 (1997); *Seminole Tribe of Florida v. Florida*, 517 U.S. at ___, 116 S.Ct. at 1127, 134 L.Ed.2d at 271; *Hawaii v. Standard Oil Co.*, 405 U.S. at 258-59 n.12 and cases cited therein. The Special Master's reasoning confuses the power to resolve disputes between states with the power to resolve disputes between private individuals and states, which is constrained by the 11th Amendment.

The Special Master also relies on the Court's statement (in response to the argument that money damages would not benefit the actual injured parties) that "the State should recover any damages that may be awarded."

Second Report at 89, *quoting Texas v. New Mexico*, 482 U.S. at 132 n.7.[10] By referring to "*any* damages that *may* be awarded," the Court did not determine that Texas could recover damages for losses suffered by individual farmers. Rather, it simply recognized that any damages that Texas recovered for its representation of the "general public interest," *id.*, could be spent by Texas as it saw fit.[11]

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[10] The Court's statement was made in the following context:

> Texas counsel suggested that a money judgment might find its way into the general coffers of the State, rather than benefit those who were hurt. But the basis on which Texas was permitted to bring this original action is that enforcement of the Compact was of such general public interest that the sovereign State was a proper plaintiff. *See Maryland v. Louisiana*, 451 U.S. 725, 735-739 (1981). It is wholly consistent with that view that the State should recover any damages that may be awarded, money it would be free to spend in the way it determines is in the public interest.

482 U.S. at 132 n.7.

[11] It would be a strange interpretation of the 11th Amendment to allow a state to recover money damages for losses suffered by individuals only if it decides to keep the money in the state coffers rather than aiding the injured individuals. Such an interpretation would also be inconsistent with the determination in *Texas v. New Mexico* that the state "would be free to spend [the money] in the way it determines is in the public interest." 482 U.S. at 132 n.7. Therefore, the applicability of the 11th Amendment must depend not on how the state ultimately spends any damages it may recover, but on the nature and origin of the claims on which damages are based.

Third, the Special Master reads the Court's Laramie River decisions[12] as doing "exactly what Colorado now says it cannot do" because the equitable apportionment of the Laramie River was based on the prior appropriations of individual water users. Second Report at 94. The Laramie River cases, however, are consistent with the concept of quasi-sovereignty described above. Although the states' apportionments were based on use by their respective water users, they were not the *same* as those individual claims.[13] The final decision made this clear by stating that the apportionment "determine[d] only the relative rights of the two States," *Wyoming v. Colorado*, 309 U.S. 572, 575 (1940), and that each state could determine in-state uses according to its own laws. *Id.* at 579-81; *see also Connecticut v. Massachusetts*, 282 U.S. 660, 670 (1931). Thus, the states' apportionments were "independent of and behind," *see Snapp*, 458 U.S. at 604, those of their water users.

If the states' quasi-sovereign interests in the waters of an interstate stream were simply based on the aggregation of their citizens' rights, the Court could not have declared:

> Apportionment calls for the exercise of an informed judgment on a consideration of many factors. Priority of appropriation is the guiding

[12] *Wyoming v. Colorado*, 259 U.S. 419 (1922); *Wyoming v. Colorado*, 286 U.S. 494 (1932); *Wyoming v. Colorado*, 298 U.S. 573 (1936); *Wyoming v. Colorado*, 309 U.S. 572 (1940).

[13] The Court held that, as between two states that followed the prior appropriation doctrine, priority of use should be the primary basis for determining the relative rights of the states. *Wyoming v. Colorado*, 259 U.S. at 470.

> principle. But physical and climatic conditions, the consumptive use of water in the several sections of the river, the character and rate of return flows, the extent of established uses, the availability of storage water, the practical effect of wasteful uses on downstream areas, the damage to upstream areas as compared to the benefits to downstream areas if a limitation is imposed on the former – these are all relevant factors. They are merely an illustrative, not an exhaustive catalogue. They indicate the nature of the problem of apportionment and the delicate adjustment of interests which must be made.

Nebraska v. Wyoming, 325 U.S. 589, 618 (1945).

The Arkansas River Compact does not change the nature of Kansas' quasi-sovereign interest in this case. The Compact settles disputes "between the states of Colorado and Kansas, and between the citizens of one and citizens of the other state, . . . " Arkansas River Compact, Article I(A). It does *not* purport to resolve disputes between the citizens of Kansas and the State of Colorado, and the 11th Amendment embodies "the background principle of state sovereign immunity" which precludes such claims. *Seminole Tribe*, 517 U.S. at ___, 116 S.Ct. at 1131, 134 L.Ed.2d at 276-77.[14] Any waiver of such immunity must be clearly expressed. *See Port Authority Trans-*

[14] *See also Seminole Tribe*, 517 U.S. at ___ n.13, 116 S.Ct. at 1140 n.13, 134 L.Ed.2d at 288 n.13 (Stevens, J., dissenting) (11th Amendment designed primarily to prevent states from being sued for debt collection).

Hudson Corp. v. Feeney, 495 U.S. 299, 305 (1990).[15] Further, the fact that Colorado's proposed water remedy may benefit water users in Kansas does not somehow give Kansas the right to recover damages from Colorado for losses suffered by water users in Kansas. Water would be delivered *to Kansas*.[16] Delivery to, and benefits to, Kansas water users are matters left to Kansas. Arkansas River Compact, Article VI(A)(1). This is simply an instance in which equitable relief obtained by a state in its quasi-sovereign capacity may benefit private individuals.

Fourth, the Special Master states that Kansas is the signatory to the Arkansas River Compact and the only party that can sue to protect the Stateline flows guaranteed for use by Kansas water users under the Compact. Second Report at 103. He concludes that Kansas "would be a feeble representative" if it could not recover damages for losses suffered by individual farmers. *Id.*

The Special Master's reasoning elevates equitable considerations above the principle of state sovereign

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[15] The Court will give effect to a State's waiver of Eleventh Amendment immunity only where stated by the most express language or by such overwhelming implication from the text as will leave no room for any other reasonable construction.

Id., quoting Atascadero State Hosp. v. Scanlon, 473 U.S. 234, 239 (1985) (quotation marks omitted).

[16] The Court said in *Texas v. New Mexico* that delivering more water to make up shortfalls "has all the earmarks of specific performance, an equitable remedy that requires some attention to the relative benefits and burdens that the parties may enjoy or suffer as compared with a legal remedy in damages." *Texas v. New Mexico*, 482 U.S. at 131.

immunity embodied in the 11th Amendment, which prevents individual farmers from recovering damages from Colorado. *See Seminole Tribe*, 517 U.S. at ___, 116 S.Ct. at 1131-32, 134 L.Ed.2d at 276-77. The fact that those claims are barred does not allow Kansas to recover those losses. *New Hampshire v. Louisiana*, 108 U.S. at 91. Rather, it is the Special Master who disregards the fundamental principle that "[a]n action brought by one state against another violates the Eleventh Amendment if the plaintiff State is actually suing to recover for injuries to designated individuals." *Hawaii v. Standard Oil Co.*, 405 U.S. at 258-59 n.12. The Special Master's reasoning would make Kansas a sovereign trustee, able to recover for injuries to individuals when those individuals cannot.

The Special Master restates, and implicitly accepts, Kansas' argument that "under the compact a state and its citizens are treated as one." Second Report at 99. If Kansas actually owned the water rights which its water users exercise, the Special Master's decision might fit within the reasoning of *South Dakota v. North Carolina*, 192 U.S. 286 (1904), in which South Dakota was allowed to recover on North Carolina bonds which were "given outright and absolutely to the state." *Id.* at 310. But the assumption that Kansas' rights under the Compact and the water rights of individual Kansas water users are identical is erroneous and unsupported. There has certainly been no outright transfer of rights, as there was in *South Dakota v. North Carolina*. Neither the Special Master nor Kansas has pointed to any language in the Compact which effects such a transfer of rights; nor do this Court's previous decisions support such an assumption. To say that private

water rights may be circumscribed by a state's overarching compact apportionment, *see Hinderlider v. La Plata River & Cherry Creek Ditch Co.*, 304 U.S. 92, 106 (1938), or that a state's compact apportionment may be based on or even "indissolubly linked" to private water rights, *see Wyoming v. Colorado*, 286 U.S. at 508, is not to say that the two are identical.

The inclusion of losses to individuals in Kansas' recovery is unprecedented and contrary to the 11th Amendment. Colorado respectfully urges the Court to grant Colorado's exception to the Special Master's recommendation.

II. PREJUDGMENT INTEREST SHOULD NOT BE AWARDED ON KANSAS' UNLIQUIDATED CLAIM AGAINST COLORADO

Kansas argued that an award of prejudgment interest is necessary to provide complete compensation for injuries resulting from Colorado's violation of the Compact. Second Report at 105. Colorado opposed such an award on the grounds that Kansas did not complain about a compact violation until 1984 at the earliest, that thereafter there was a good-faith dispute over compact compliance, and that the amount of any depletion was not readily ascertainable. *See id.* at 105-06. Colorado noted that the common law rule is that prejudgment interest is not awarded on unliquidated damages and that prejudgment interest had not been awarded on judgments in cases between states, absent a clear obligation to pay prejudgment interest. *E.g., Virginia v. West Virginia*, 238 U.S. 202, 234-35 (1915).

The Special Master concludes that if the remedy here includes money damages, the unliquidated nature of Kansas' claim does not, as a matter of law, bar an award of prejudgment interest. Second Report at 110. In reaching this conclusion, the Special Master relies heavily on the Court's recent decision in *City of Milwaukee v. Cement Div., National Gypsum Co.*, 515 U.S. 189 (1995), and on cases which involved statutory awards of prejudgment interest.

As the Special Master acknowledges, *City of Milwaukee* was an admiralty case, where the general rule has been to allow prejudgment interest. Second Report at 108. He cites the Court's observation that the distinction between liquidated and unliquidated claims "has faced trenchant criticism for a number of years." *Id.* at 106, *citing City of Milwaukee*, 515 U.S. at 197. However, the cases cited by the Court as examples of "trenchant criticism" involved awards of prejudgment interest granted pursuant to statutory provisions. For example, *Funkhouser v. J.B. Preston Co.*, 290 U.S. 163 (1933), simply determined that a New York statute providing for prejudgment interest was not an unconstitutional impairment of contracts. While there has been a trend in recent years to allow prejudgment interest on unliquidated claims, that trend has been primarily the result of legislative action. *Cf. Monessen Southwestern R. Co. v. Morgan*, 486 U.S. 330, 339 (1988) (denying prejudgment interest in FELA claims because of congressional inaction to change longstanding common law rule).

The Court has found prejudgment interest to be appropriate to effectuate the purpose of federal remedial schemes, which typically include detailed enforcement

provisions, including time limits for bringing claims. *See, e.g., Loeffler v. Frank*, 486 U.S. 549 (1988) (approving prejudgment interest in sex discrimination case against U.S. Postal Service); 42 U.S.C. §2000e-16(c) (imposing time limit for bringing such claims). Statutory provisions providing for prejudgment interest have also been accompanied by legislative changes placing other limits on liability. *See General Motors Corp. v. Devex Corp.*, 461 U.S. 648, 654-55 (1983) (noting that 1946 change in patent infringement law providing for prejudgment interest contained corresponding change eliminating recovery of infringer's profits).[17]

As the Special Master recognizes, "Kansas' claim for damages in this case certainly represents an unliquidated claim." Second Report at 110. Colorado's violation of the Compact was not willful or deliberate, First Report at 169, Second Report at 77-78, 80, and determining material depletions of usable Stateline flows due to wells "is not simple." First Report at 161. This Court found that the "vague and conflicting evidence" concerning well depletions excused Kansas' failure to raise its claims for 35 years. *Kansas v. Colorado*, 514 U.S. at 688. Given these facts and the lack of a time limitation on actions for violation of an interstate compact, this is not a case in which to cast aside the traditional rule against awarding prejudgment interest on unliquidated claims.

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[17] *General Motors Corp.* also recited the common law standard (which the Court would presumably have followed in the absence of a statutory change), under which "prejudgment interest could not be awarded where damages were unliquidated absent bad faith or other exceptional circumstances." 461 U.S. at 653.

III. THE SPECIAL MASTER'S RULINGS WILL HAVE FAR-REACHING AND UNINTENDED CONSEQUENCES

As Colorado has explained above, the Special Master's ruling on recovery of damages for losses by individuals creates an unprecedented expansion of the concept of quasi-sovereignty. The Special Master's rulings also have the potential to encourage interstate litigation, to discourage the resolution of interstate disputes through mutual accommodation and agreement, and to increase the risk of double recoveries.

The award of money damages for breach of an interstate compact equitably apportioning an interstate stream is a relatively new concept. *Texas v. New Mexico* is the only case of which Colorado is aware where the award of such damages was approved, and the scope of damages was not ruled on, but resolved by consent decree. As this Court has noted, "there is a striking contrast between the potential impact of suits for injunctive relief and suits for damages." *Hawaii v. Standard Oil Co.*, 405 U.S. at 262. However, *parens patriae* actions by states to vindicate quasi-sovereign interests are being brought with increasing frequency in the lower courts against defendants other than states. *See, e.g., In re Edmond*, 934 F.2d 1304 (4th Cir. 1991); *People ex rel. Abrams v. Seneci*, 817 F.2d 1015 (2d Cir. 1987); *Pennsylvania v. Porter*, 659 F.2d 306 (3d Cir. 1981); *California v. Frito-Lay, Inc.*, 474 F.2d 774 (9th Cir. 1973); *Maine v. M/V Tamano*, 357 F.Supp. 1097 (D. Maine 1973). *Parens patriae* actions do not depend on whether individuals are foreclosed from separate recovery, but whether the state has an independent interest behind the

titles or interests of its citizens. *See Pennsylvania v. Porter*, 659 F.2d at 318 n.16, and cases cited therein.

Because the 11th Amendment is not a factor in such cases, careful application of the concept of quasi-sovereignty is necessary to avoid the risk of double recoveries. Unless this Court corrects it, the Special Master's fusion of states' quasi-sovereign interests with the private interests of their citizens will confuse the distinction between the two and increase the risk of double recoveries. Following the Special Master's reasoning, states may bring *parens patriae* actions for damages to individuals for civil rights violations, *see Porter*, for employment discrimination, *see Snapp*, or in bankruptcy proceedings, *see Edmond*; yet defendants may remain subject to suits by individuals to recover for the identical injuries.

Further, even a state which did not intend to recover for its citizens' injuries would have to be extremely careful in circumscribing its environmental enforcement proceedings, so that defendants would not be able to use judgments by the state to foreclose claims by individuals for damages to their private property. *See Satsky v. Paramount Communications, Inc.*, 7 F.3d 1464 (10th Cir. 1993) (because of nature of *parens patriae* representation, previous state judgment against polluter for natural resources damages did *not* foreclose claims by individuals for damages to private property).

More troublesome are the implications of the Special Master's recommendations for the formation of interstate compacts. The Special Master's recommendations expand the effect of the Arkansas River Compact beyond its

terms and subject Colorado to potentially enormous damages for a violation which was not apparent for 35 years, which was not deliberate or willful, and for which no statute of limitations has been recognized. This Court has repeatedly encouraged states to resolve controversies through compacts rather than by resort to litigation in this Court, *see Texas v. New Mexico*, 462 U.S. 554, 575 (1983), and cases cited therein; yet the Special Master's recommendation may make states hesitate to enter into compacts when the consequences of a non-deliberate, non-willful breach may be enormous.

Further, the Special Master's recommendations will encourage litigation between states in this Court by opening the door to recovery for losses to individuals (including prejudgment interest on such losses) that would be barred by the 11th Amendment if brought by the individuals themselves. The Special Master's recommendations also create a financial incentive for delay in enforcing interstate compacts. Rather than redressing injuries through prompt investigation or enforcement, a state may sit back, say nothing, and then decades later reap profits by converting individuals' injuries to a state recovery.

Colorado respectfully requests that the Court correct the Special Master's recommendations on money damages based on losses incurred by water users in Kansas and on the applicability of prejudgment interest.

Respectfully submitted this 20th day of November, 1997.

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ARKANSAS RIVER COMPACT, 1948

The State of Colorado and the State of Kansas, parties signatory to this Compact (hereinafter referred to as "Colorado" and "Kansas", respectively, or individually as a "State", or collectively as the "States") having resolved to conclude a compact with respect to the waters of the Arkansas River, and being moved by considerations of interstate comity, having appointed commissioners as follows: "Henry C. Vidal, Gail L. Ireland, and Harry B. Mendenhall, for Colorado; and George S. Knapp, Edward F. Arn, William E. Leavitt, and Roland H. Tate, for Kansas"; and the consent of the Congress of the United States to negotiate and enter into an interstate compact not later than January 1, 1950, having been granted by Public Law 34, 79th Congress, 1st Session, and pursuant thereto the President having designated Hans Kramer as the representative of the United States, the said commissioners for Colorado and Kansas, after negotiations participated in by the representatives of the United States, have agreed as follows:

ARTICLE I

The major purposes of this Compact are to:

A. Settle existing disputes and remove causes of future controversy between the States of Colorado and Kansas, and between citizens of one and citizens of the other State, concerning the waters of the Arkansas River and their control, conservation and utilization for irrigation and other beneficial purposes.

B. Equitably divide and apportion between the States of Colorado and Kansas the waters of the Arkansas River and their utilization as well as the benefits arising from the construction, operation and maintenance by the United States of John Martin Reservoir Project for water conservation purposes.

ARTICLE II

The provisions of this Compact are based on (1) the physical and other conditions peculiar to the Arkansas River and its natural drainage basin, and the nature and location of irrigation and other developments and facilities in connection therewith; (2) the opinion of the United States Supreme Court entered December 6, 1943, in the case of *Colorado v. Kansas* (320 U.S. 383) concerning the relative rights of the respective States in and to the use of waters of the Arkansas River; and (3) the experience derived under various interim executive agreements between the two States apportioning the waters released from the John Martin Reservoir as operated by the Corps of Engineers.

ARTICLE III

As used in this Compact:

A. The word "Stateline" means the geographical boundary line between Colorado and Kansas.

B. The term "waters of the Arkansas River" means the waters originating in the natural drainage basin of the Arkansas River, including its tributaries, upstream from

the Stateline, and excluding waters brought into the Arkansas River Basin from other river basins.

C. The term "Stateline flow" means the flow of waters of the Arkansas River as determined by gaging stations located at or near the Stateline. The flow as determined by such stations, whether located in Colorado or Kansas, shall be deemed to be the actual Stateline flow.

D. "John Martin Reservoir Project" is the official name of the facility formerly known as Caddoa Reservoir Project, authorized by the Flood Control Act of 1936, as amended, for construction, operation and maintenance by the War Department, Corps of Engineers, later designated as the Corps of Engineers, Department of the Army, and herein referred to as the "Corps of Engineers". "John Martin Reservoir" is the water storage space created by "John Martin Dam".

E. The "flood control storage" is that portion of the total storage space in John Martin Reservoir allocated to flood control purposes.

F. The "conservation pool" is that portion of the total storage space in John Martin Reservoir lying below the flood control storage.

G. The "ditches of Colorado Water District 67" are those ditches and canals which divert water from the Arkansas River or its tributaries downstream from John Martin Dam for irrigation use in Colorado.

H. The term "river flow" means the sum of the flows of the Arkansas and the Purgatoire Rivers into John Martin Reservoir as determined by gaging stations appropriately located above said Reservoir.

I. The term "the Administration" means the Arkansas River Compact Administration established under Article VIII.

ARTICLE IV

Both States recognize that:

A. This Compact deals only with the waters of the Arkansas River as defined in Article III.

B. This Compact is not concerned with the rights, if any, of the State of New Mexico or its citizens in and to the use in New Mexico of waters of Trinchera Creek or other tributaries of the Purgatoire River, a tributary of the Arkansas River.

C. (1) John Martin Dam will be operated by the Corps of Engineers to store and release the waters of the Arkansas River in and from John Martin Reservoir for its authorized purposes.

(2) The bottom of the flood control storage is presently fixed by the Chief of Engineers, U.S. Army, at elevation 3,851 feet above mean sea level. The flood control storage will be operated for flood control purposes and to those ends will impound or regulate the streamflow volumes that are in excess of the then available storage capacity of the conservation pool. Releases from the flood control storage may be made at times and rates determined by the Corps of Engineers to be necessary or advisable without regard to ditch diversion capacities or requirements in either or both States.

(3) The conservation pool will be operated for the benefit of water users in Colorado and Kansas, both

upstream and downstream from John Martin Dam, as provided in this Compact. The maintenance of John Martin Dam and appurtenant works may at times require the Corps of Engineers to release water then impounded in the conservation pool or to prohibit the storage of water therein until such maintenance work is completed. Flood control operation may also involve temporary utilization of conservation storage.

D. This Compact is not intended to impede or prevent future beneficial development of the Arkansas River basin in Colorado and Kansas by Federal or State agencies, by private enterprise, or by combinations thereof, which may involve construction of dams, reservoir, and other works for the purpose of water utilization and control, as well as the improved or prolonged functioning of existing works: Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction.

ARTICLE V

Colorado and Kansas hereby agree upon the following basis of apportionment of the waters of the Arkansas River:

A. Winter storage in John Martin Reservoir shall commence on November 1st of each year and continue to and include the next succeeding March 31st. During said period all water entering said reservoir up to the limit of the then available conservation capacity shall be stored: Provided, that Colorado may demand releases of water

equivalent to the river flow, but such releases shall not exceed 100 c.f.s. (cubic feet per second) and water so released shall be used without avoidable waste.

B. Summer storage in John Martin Reservoir shall commence on April 1st of each year and continue to and include the next succeeding October 31st. During said period, except when Colorado water users are operating under decreed priorities as provided in paragraphs F and G of this Article, all water entering said reservoir up to the limit of the then available conservation capacity shall be stored: Provided, that Colorado may demand releases of water equivalent to the river flow up to 500 c.f.s., and Kansas may demand releases of water equivalent to that portion of the river flow between 500 c.f.s. and 750 c.f.s., irrespective of releases demanded by Colorado.

C. Releases of water stored pursuant to the provisions of paragraphs A and B of this Article shall be made upon demands by Colorado and Kansas concurrently or separately at any time during the summer storage period. Unless increases to meet extraordinary conditions are authorized by the Administration, separate releases of stored water to Colorado shall not exceed 750 c.f.s., separate releases of stored water to Kansas shall not exceed 500 c.f.s., and concurrent releases of stored water shall not exceed a total of 1,250 c.f.s.: Provided, that when water stored in the conservation pool is reduced to a quantity less than 20,000 acre-feet, separate releases of stored water to Colorado shall not exceed 600 c.f.s., separate releases of stored water to Kansas shall not exceed 400 c.f.s., and concurrent releases of stored water shall not exceed 1,000 c.f.s.

D. Releases authorized by paragraphs A, B and C of this Article, except when all Colorado water users are operating under decreed priorities as provided in paragraphs F and G of this Article, shall not impose any call on Colorado water users that divert waters of the Arkansas River upstream from John Martin Dam.

E. (1) Releases of stored water and releases of river flow may be made simultaneously upon the demands of either or both States.

(2) Water released upon concurrent or separate demands shall be applied promptly to beneficial use unless storage thereof downstream is authorized by the Administration.

(3) Releases of river flow and of stored water to Colorado shall be measured by gaging stations located at or near John Martin Dam and the releases to which Kansas is entitled shall be satisfied by an equivalent in Stateline flow.

(4) When water is released from John Martin Reservoir appropriate allowances as determined by the Administration shall be made for the intervals of time required for such water to arrive at the points of diversion in Colorado and at the Stateline.

(5) There shall be no allowance or accumulation of credits or debits for or against either State.

(6) Storage, releases from storage and releases of river flow authorized in this Article shall be accomplished pursuant to procedures prescribed by the Administration under the provisions of Article VIII.

F. In the event the Administration finds that within a period of fourteen (14) days the water in the conservation pool will be or is liable to be exhausted, the Administration shall forthwith notify the State Engineer of Colorado, or his duly authorized representative, that commencing upon a day certain within said fourteen (14) day period, unless a change of conditions justifies cancellation or modification of such notice, Colorado shall administer the decreed rights of water users in Colorado Water District 67 as against each other and as against all rights now or hereafter decreed to water users diverting upstream from John Martin Dam on the basis of relative priorities in the same manner in which their respective priority rights were administered by Colorado before John Martin Reservoir began to operate and as though John Martin Dam had not been constructed. Such priority administration by Colorado shall be continued until the Administration finds that water is again available in the conservation pool for release as provided in this Compact, and timely notice of such finding shall be given by the Administration to the State Engineer of Colorado or his duly authorized representative: Provided, that except as controlled by the operation of the preceding provisions of this paragraph and other applicable provisions of this Compact, when there is water in the conservation pool the water users upstream from John Martin Reservoir shall not be affected by the decrees to the ditches in Colorado Water District 67. Except when administration in Colorado is on a priority basis the water diversions in Colorado Water District 67 shall be administered by Colorado in accordance with distribution agreements made

from time to time between the water users in such District and filed with the Administration and with the State Engineer of Colorado or, in the absence of such agreement, upon the basis of the respective priority decrees, as against each other, in said District.

G. During periods when Colorado reverts to administration of decreed priorities, Kansas shall not be entitled to any portion of the river flow entering John Martin Reservoir. Waters of the Arkansas River originating in Colorado which may flow across the Stateline during such periods are hereby apportioned to Kansas.

H. If the usable quantity and available for use of the waters of the Arkansas River to water users in Colorado Water District 67 and Kansas will be thereby materially depleted or adversely affected, (1) priority rights now decreed to the ditches of Colorado Water District 67 shall not hereafter be transferred to other water districts in Colorado or to points of diversion or places of use upstream from John Martin Dam; and (2) the ditch diversion rights from the Arkansas River in Colorado Water District 67, and of Kansas ditches between the Stateline and Garden City shall not hereafter be increased beyond the total present rights of said ditches, without the Administration, in either case (1) or (2), making findings of fact that no such depletion or adverse effect will result from such proposed transfer or increase. Notice of legal proceedings for any such proposed transfer or increase shall be given to the Administration in the manner and within the time provided by the laws of Colorado or Kansas in such cases.

ARTICLE VI

A. (1) Nothing in this Compact shall be construed as impairing the jurisdiction of Kansas over the waters of the Arkansas River that originate in Kansas and over the waters that flow from Colorado across the Stateline into Kansas.

(2) Except as otherwise provided, nothing in this Compact shall be construed as supplanting the administration by Colorado of the rights of appropriators of waters of the Arkansas River in said State as decreed to said appropriators by the courts of Colorado, nor as interfering with the distribution among said appropriators by Colorado, nor as curtailing the diversion and use for irrigation and other beneficial purposes in Colorado of the waters of the Arkansas River.

B. Inasmuch as the Frontier Canal diverts waters of the Arkansas River in Colorado west of the Stateline for irrigation uses in Kansas only, Colorado concedes to Kansas and Kansas hereby assumes exclusive administrative control over the operation of the Frontier Canal and its headworks for such purposes, to the same extent as though said works were located entirely within the State of Kansas. Water carried across the Stateline in the Frontier Canal or another similarly situated canal shall be considered to be part of the Stateline flow.

ARTICLE VII

A. Each State shall be subject to the terms of this Compact. Where the name of the State or the term "State" is used in this Compact these shall be construed to

include any person or entity of any nature whatsoever using, claiming or in any manner asserting any right to the use of the waters of the Arkansas River under the authority of that State.

B. This Compact establishes no general principle or precedent with respect to any other interstate stream.

C. Wherever any State or Federal official or agency is referred to in this Compact such reference shall apply to the comparable official or agency succeeding to their duties and functions.

ARTICLE VIII

A. To administer the provisions of this Compact there is hereby created an interstate agency to be known as the Arkansas River Compact Administration herein designated as "The Administration."

B. The Administration shall have power to:

(1) Adopt, amend and revoke by-laws, rules and regulations consistent with the provisions of this Compact;

(2) Prescribe procedures for the administration of this Compact: Provided, that where such procedures involve the operation of John Martin Reservoir Project they shall be subject to the approval of the District Engineer in charge of said Project;

(3) Perform all functions required to implement this Compact and to do all things necessary, proper or convenient in the performance of its duties.

C. The membership of the Administration shall consist of three representatives from each State who shall be appointed by the respective Governors for a term not to exceed four years. One Colorado representative shall be a resident of and water right owner in Water Districts 14 or 17, one Colorado representative shall be a resident of and water right owner in Water District 67, and one Colorado representative shall be the Director of the Colorado Water Conservation Board. Two Kansas representatives shall be residents of and water right owners in the counties of Finney, Kearny or Hamilton, and one Kansas representative shall be the chief State official charged with the administration of water rights in Kansas. The President of the United States is hereby requested to designate a representative of the United States, and if a representative is so designated he shall be an ex-officio member and act as chairman of the Administration without vote.

D. The State representatives shall be appointed by the respective Governors within thirty days after the effective date of this Compact. The Administration shall meet and organize within sixty days after such effective date. A quorum for any meeting shall consist of four members of the Administration: Provided, that at least two members are present from each State. Each State shall have but one vote in the Administration and every decision, authorization or other action shall require unanimous vote. In case of a divided vote on any matter within the purview of the Administration, the Administration may, by subsequent unanimous vote, refer the matter for arbitration to the Representative of the United States or other arbitrator or arbitrators, in which event

the decision made by such arbitrator or arbitrators shall be binding upon the Administration.

E. (1) The salaries, if any, and the personal expenses of each member shall be paid by the government which he represents. All other expenses incident to the administration of this Compact which are not paid by the United States shall be borne by the States on the basis of 60 per cent by Colorado and 40 per cent by Kansas.

(2) In each even numbered year the Administration shall adopt and transmit to the Governor of each State its budget covering anticipated expenses for the forthcoming biennium and the amount thereof payable by each State. Each State shall appropriate and pay the amount due by it to the Administration.

(3) The Administration shall keep accurate accounts of all receipts and disbursements and shall include a statement thereof, together with a certificate of audit by a certified public accountant, in its annual report. Each State shall have the right to make an examination and audit of the accounts of the Administration at any time.

F. Each State shall provide such available facilities, equipment and other assistance as the Administration may need to carry out its duties. To supplement such available assistance the Administration may employ engineering, legal, clerical, and other aid as in its judgment may be necessary for the performance of its functions. Such employees shall be paid by and be responsible to the Administration, and shall not be considered to be employees of either State.

G. (1) The Administration shall cooperate with the chief official of each State charged with the administration of water rights and with Federal agencies in the systematic determination and correlation of the facts as to the flow and diversion of the waters of the Arkansas River and as to the operation and siltation of John Martin Reservoir and other related structures. The Administration shall cooperate in the procurement, interchange, compilation and publication of all factual data bearing upon the administration of this Compact without, in general, duplicating measurements, observations or publications made by State or Federal agencies. State officials shall furnish pertinent factual data to the Administration upon its request. The Administration shall, with the collaboration of the appropriate Federal and State agencies, determine as may be necessary from time to time, the location of gaging stations required for the proper administration of this Compact and shall designate the official records of such stations for its official use.

(2) The Director, U.S. Geological Survey, the Commissioner of Reclamation and the Chief of Engineers, U.S. Army, are hereby requested to collaborate with the Administration and with appropriate State officials in the systematic determination and correlation of data referred to in paragraph G(1) of this Article and in the execution of other duties of such officials which may be necessary for the proper administration of this Compact.

(3) If deemed necessary for the administration of this Compact, the Administration may require the installation and maintenance, at the expense of water users, of measuring devices of approved type in any ditch or group of ditches diverting water from the Arkansas

River in Colorado or Kansas. The chief official of each State charged with the administration of water rights shall supervise the execution of the Administration's requirements for such installations.

H. Violation of any of the provisions of this Compact or other actions prejudicial thereto which come to the attention of the Administration shall be promptly investigated by it. When deemed advisable as the result of such investigation, the Administration may report its findings and recommendations to the State official who is charged with the administration of water rights for appropriate action, it being the intent of this Compact that enforcement of its terms shall be accomplished in general through the State agencies and officials charged with the administration of water rights.

I. Findings of fact made by the Administration shall not be conclusive in any court or before any agency or tribunal but shall constitute prima facie evidence of the facts found.

J. The Administration shall report annually to the Governors of the States and to the President of the United States as to matters within its purview.

ARTICLE IX

A. This Compact shall become effective when ratified by the Legislature of each State and when consented to by the Congress of the United States by legislation providing substantially, among other things, as follows:

"Nothing contained in this Act or in the Compact herein consented to shall be construed as impairing

affecting the sovereignty of the United States or any of its rights or jurisdiction in and over the area or waters which are the subject of such Compact: Provided, that the Chief of Engineers is hereby authorized to operate the conservation features of the John Martin Reservoir Project in a manner conforming to such Compact with such exceptions as he and the Administration created pursuant to the Compact may jointly approve."

B. This Compact shall remain in effect until modified or terminated by unanimous action of the States and in the event of modification or termination all rights then established or recognized by this Compact shall continue unimpaired.

IN WITNESS WHEREOF, The commissioners have signed this Compact in triplicate original, one of which shall be forwarded to the Secretary of State of the United States of America and one of which shall be forwarded to the Governor of each signatory State.

Done in the City and County of Denver, in the state of Colorado, on the fourteenth day of December, in the Year of our Lord One Thousand Nine Hundred and Forty-eight.

Henry C. Vial
Gail L. Ireland
Harry B. Mendenhall
Commissioners for Colorado

George S. Knapp
Edward F. Arn
William E. Leavitt
Roland H. Tate
Commissioners for Kansas

Attest:
Warden L. Noe
Secretary

Approved:
Hans Kramer
Representative of the United States

(24)

No. 105, Original

Supreme Court, U.S.
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In The

Supreme Court of the United States

October Term, 1997

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO

On Exceptions To Second Report
Of The Special Master

REPLY BRIEF FOR KANSAS OPPOSING THE EXCEPTIONS OF COLORADO

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43 M

QUESTIONS PRESENTED

This Court has held that water or money may be awarded to an aggrieved State for the breach of a compact apportioning an interstate stream. *Texas v. New Mexico*, 482 U.S. 124, 130 (1987). The Court has determined that such a breach occurred in this case. The questions presented are:

1. If the aggrieved State's remedy includes money damages, does the Eleventh Amendment to the United States Constitution preclude those damages from being measured, in part, by the value of the water to water users of the aggrieved State?

2. Does the unliquidated nature of the aggrieved State's claim bar the award of prejudgment interest as a matter of law?

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REPLY BRIEF FOR KANSAS OPPOSING THE EXCEPTIONS OF COLORADO

The State of Kansas submits this Reply Brief in support of the Second Report of Arthur L. Littleworth, Special Master, and in opposition to the State of Colorado's Exceptions and Brief.

CONSTITUTIONAL PROVISIONS, TREATIES, STATUTES, ORDINANCES, AND REGULATIONS INVOLVED

The Colorado Exceptions involve:

1. The Eleventh Amendment to the United States Constitution:

> "The judicial power of the United States shall not be construed to extend to any suit in law or equity, commenced or prosecuted against one of the United States by Citizens of another State, or by Citizens or Subjects of any Foreign State."

2. The Arkansas River Compact, 63 Stat. 145 (1949), which is set forth in the Appendix to Colorado's Brief In Support of Colorado's Exceptions to the Second Report of the Special Master.

STATEMENT

The Special Master submitted his Second Report in this proceeding on September 8, 1997, setting forth his recommendations to the Supreme Court on matters tried and briefed since the issuance of the Opinion of the Court

in *Kansas v. Colorado*, 514 U.S. 673 (1995). The Court received and ordered filed the Second Report and set the schedule for filing exceptions and briefs. *Kansas v. Colorado*, 118 S. Ct. 39 (1997). Colorado has filed two Exceptions to the Second Report of the Special Master and a Brief in Support Thereof ("Colorado Brief"). Kansas has filed no exceptions to the Second Report.

In this original action Kansas seeks enforcement of the Arkansas River Compact (Compact) against Colorado. The Special Master found in the First Report of Special Master, *Kansas v. Colorado*, No. 105, Orig. (July 1994) (First Report) that "the evidence clearly showed that postcompact well pumping in Colorado had seriously depleted Arkansas River flows into Kansas in violation of the compact." Second Report 1. The Compact requires that waters of the Arkansas River not be materially depleted in usable quantity or availability for use to the water users of Colorado and Kansas. Article IV-D. In its May 1995 Opinion, the Court accepted the Special Master's conclusion that postcompact well pumping in Colorado had caused material depletions of usable Stateline flows in violation of the Compact. *Kansas v. Colorado*, 514 U.S. 673, 693-694 (1995). Since the Court's Opinion, trial and briefing have proceeded before the Special Master regarding quantification of the depletions in violation of the Compact for the period 1950-1994, consideration of Colorado's efforts to show that it has come into current compliance with the Compact, and consideration of legal issues related to remedies for past depletions. Second Report 2. No evidence has yet been taken on the amount of money damages or on whether repayment should be in water or money.

As a result of these recent proceedings, the Special Master has recommended that the Court find that depletions in violation of the Arkansas River Compact for the period 1950-1985 are the stipulated amount of 328,505 acre-feet[1] and that depletions for the period 1986-1994 are 91,565 acre-feet. In addition, he has recommended approval of his denial of Kansas' Motion For Injunction, by which Kansas sought to require Colorado to come into immediate compliance with the Compact. The Special Master has determined that, although Colorado has yet to show that it is in compliance, it is making sufficient efforts to preclude the need for interim injunctive relief at this point in time. Further, the Special Master has requested that the Stipulation between the States regarding credits associated with the Offset Account in John Martin Reservoir for Colorado Pumping, established by the Arkansas River Compact Administration jointly with the U.S. Army Corps of Engineers in 1997, be approved; that evidence be received on whether the remedy for past damages be in water or in money; that, if money damages are awarded, those damages be based upon Kansas' loss rather than upon any gain to Colorado, subject to the overriding consideration that the remedy provide a fair and equitable solution; that, if the remedy includes money damages, the Eleventh Amendment to the U.S. Constitution be determined not to preclude basing the damages to Kansas, in part, on losses incurred by its water users, again subject to the overall consideration of

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[1] One acre-foot is 325,851 gallons. The Supreme Court Courtroom inside the pillars has a volume of approximately 3½ acre-feet.

fairness; and that the unliquidated nature of Kansas' claim not bar the award of prejudgment interest, whether the remedy includes money damages or water repayment. Second Report 112-114, ¶¶ 1-9.

In the first trial phase, Colorado offered its own model to quantify the effects of postcompact pumping. After the 1995 Opinion, Colorado withdrew its own model in light of the fact that it showed greater depletions than the original Kansas H-I Model. *Id.*, at 7-10, 19. In his Second Report, the Special Master approved changes to the Kansas H-I Model that cause it to account for depletions due to postcompact well pumping that are considerably greater than those produced in the first trial phase by the original version of the H-I Model. *Id.*, at 20. Based on that earlier version of the H-I Model, the States stipulated that the depletions by Colorado of usable flow in violation of the Compact, for the period 1950-1985 were 328,505 acre-feet. *Id.*, at 11. The Special Master has determined, however, that there are "solid indications" that the H-I Model as used to arrive at the 328,505 figure "may well underestimate depletions." *Id.*, at 11, 20. This conclusion was based on testimony by experts for both States. See *id.*, at 20. In fact, for the period 1986-1994, the Kansas H-I Model approved by the Special Master showed depletions to usable Stateline flow of 91,565 acre-feet while the unchanged H-I Model proposed by Colorado calculated usable depletions of only 30,700 acre-feet. Second Report 46. The ratio of depletions of Stateline flow to postcompact pumping varies depending on the time period selected. See, *e.g.*, *id.*, at 19.

The Colorado Statement of the Case asserts that Kansas complained for the first time about postcompact well

development in Colorado in 1984. Colorado Brief 2, 4. While this is true, Colorado neglects to point out the Special Master's conclusion that Kansas was not guilty of inexcusable delay in making its well-pumping claim and that Colorado had not been prejudiced by Kansas' failure to press its claim earlier. *Kansas v. Colorado*, 514 U.S., at 687. The Court overruled Colorado's exception to that determination. *Id.*, at 687-689. Moreover, as late as 1985, Colorado officials refused to permit an investigation by the Arkansas River Compact Administration of well development in Colorado because, they claimed, the evidence produced by Kansas did not suggest that well development in Colorado had had an impact on usable Stateline flow. *Id.*, at 689.

The Colorado Statement also asserts that the Special Master described Colorado's compliance efforts as showing "a most impressive record" and "remarkable" progress. Colorado Brief 3. Actually, the "most impressive record" referred to by Colorado is taken from this statement of the Special Master: "These reports, and the extensive testimony of the Colorado State Engineer and others, show a most impressive record in *beginning* to control postcompact pumping." Second Report 47 (emphasis added). Likewise, Colorado's claim of "remarkable" progress refers to this statement of the Special Master: "*[G]iven the ineffectual and frustrating history of Colorado's previous efforts to regulate wells*, the State's current progress is quite remarkable." *Ibid.* (emphasis added); see also, *e.g.*, First Report 139 ("Colorado allowed hundreds of wells to be constructed in the river alluvium without regard to their impact upon the surface flows of the Arkansas River, either in Colorado or in Kansas."). The

Special Master also noted that Kansas has substantial concerns about the sufficiency of the current efforts, which is still unproved by Colorado. Second Report 47, 54-56. To date, Colorado has not shown that it has brought its water users into compliance with the Compact. See Second Report 113, ¶ 4.

SUMMARY OF ARGUMENT

With regard to its first Exception, the State of Colorado would have this Court upend much of its jurisprudence regarding the status, interpretation, and enforcement of interstate compacts approved by Congress. Colorado seeks to achieve this goal by asking the Court to ignore the Court's precedents with regard to interstate compacts in favor of Colorado's arguments based on cases that did not involve compacts.

Colorado also seeks to avoid this Court's precedents by suggesting that Kansas is seeking money damages owed to Kansas' water users which could be collected directly by the water users but for the Eleventh Amendment to the U.S. Constitution. The State of Kansas seeks nothing of the kind. Kansas simply seeks a contract remedy for breach of the Arkansas River Compact, which is, after all, a contract. The Special Master has determined that Colorado has violated its obligations under the Arkansas River Compact by failing to deliver some 420,000 acre-feet of water for the period 1950-1994. Colorado has filed no exception on that point. Kansas asks for the value of the water which should have been delivered to the State of Kansas at the Stateline, and related losses,

including diminution in the value of Colorado's performance occasioned by its delay.

This Court has stated in no uncertain terms that it has complete judicial power to provide one State a remedy for the breach by another State of an interstate compact. The effect of adopting Colorado's position on its Exceptions would be to eviscerate the remedy the Court has declared it will provide. Colorado asserts that Kansas is entitled to recover for its proprietary and quasi-sovereign interests so long as Kansas does not recover losses to its citizens. But there is little recovery left if Kansas' losses cannot be measured, in part, by the value of water to the Kansas farmers and other Kansas citizens.

The Colorado argument against allowing "recovery for losses to Kansas farmers" dissipates when it is realized that the loss to Kansas farmers is merely a measure, perhaps the best available measure, of a part of the damages to the State of Kansas. The damages to the State of Kansas consist in part of the value of some 420,000 acre-feet not delivered by Colorado in violation of the Arkansas River Compact between 1950 and 1994. Appraisals of the value of water at the time that Colorado illegally withheld it may also be available, and, if reliable, such evidence would be offered by Kansas in support of its claim for damages. It is anticipated, however, that for much of the period of Colorado's noncompliance the method of valuing the water illegally withheld will consist of evidence of the value the water would have had in the hands of Kansas farmers. That is not to say that Kansas is seeking recovery for its farmers or that it stands in the shoes of its farmers. Rather, Kansas is seeking damages in its own right as a sovereign State and party to

the Compact, and it expects to measure those damages, in part, by the value of the water in question to Kansas farmers in some or all of the years in question.

Further, as explained below, Kansas' quasi-sovereign interests provide an independent basis, consistent with the Eleventh Amendment, for the recovery Kansas seeks.

With regard to Colorado's second Exception, this Court has held that the award of prejudgment interest is in no way punitive, but rather, is a basic element of a complete remedy. This Court has long recognized that claims that are unliquidated when brought should nevertheless normally constitute the basis for awarding interest to the aggrieved party for the loss in value resulting from the defendant's delay in performance. This doctrine has been recognized not only between private parties, but also where a State is the defendant. Awarding such interest simply provides the aggrieved plaintiff with a complete remedy for losses suffered.

ARGUMENT

I. THE ELEVENTH AMENDMENT DOES NOT BAR KANSAS' CLAIM FOR BREACH OF THE COMPACT IN THIS PROPER ORIGINAL ACTION

The Special Master determined that a case between sister States involving sovereignty or quasi-sovereignty is regarded strictly as state litigation, to which the Eleventh Amendment does not apply. Second Report 103 (citing *Maryland v. Louisiana*, 451 U.S. 725, 745, n. 21 (1981)). The Special Master relied, in particular, on this Court's pronouncement in *Texas v. New Mexico*, 482 U.S. 124 (1987), that "[i]n *proper original actions, the Eleventh Amendment is*

no barrier, for by its terms, it applies only to suits by citizens against a State." Second Report 102 (quoting *Texas v. New Mexico*, 482 U.S., at 130) (emphasis in Second Report).

The Special Master's determination finds strong support in this Court's Eleventh Amendment decisions dating from the time of the Amendment's adoption through the present day. As this Court most recently emphasized, the sovereign immunity enacted by the Eleventh Amendment does not extend to cases "where there has been ' "a surrender of this immunity in the plan of the convention." ' " *Idaho v. Coeur d'Alene Tribe*, 117 S. Ct. 2028, 2033 (1997) (quoting *Principality of Monaco v. Mississippi*, 292 U.S. 313, 322-323 (1934) (quoting The Federalist No. 81)). One of the types of cases in which there has been a surrender of immunity is suits between sister States. *Blatchford v. Native Village of Noatak*, 501 U.S. 775, 782 (1991); *Rhode Island v. Massachusetts*, 37 U.S. (12 Pet.) 657, 720 (1838). The States, by ratifying the plan of the convention, consented to this Court's "complete judicial power to adjudicate disputes among them" in original actions. *Texas v. New Mexico*, 482 U.S., at 128.[2] No such judicial power could be exercised if the States had reserved their sovereign immunity to such suits.

In short, this Court's

> "original jurisdiction is not affected by the provisions of the Eleventh Amendment which only withholds federal judicial power in suits against

[2] This surrender of immunity was deemed necessary in the plan of the convention to effect resolution of disputes between the States by means other than diplomacy and war. *Alfred L. Snapp & Son v. Puerto Rico, ex rel., Barez*, 458 U.S. 592, 601 (1982); *Kansas v. Colorado*, 206 U.S. 46, 97 (1907).

> a State 'by Citizens of another State, or by Citizens or Subjects of any Foreign State.' Thus, an original action between two States only violates the Eleventh Amendment if the plaintiff State is actually suing to recover for injuries to specific individuals." *Maryland v. Louisiana*, 451 U.S. 725, 745, n. 21 (1981).

The Court's qualification is necessary to prevent circumvention of the Eleventh Amendment "by the simple expedient of bringing an action in the name of a State" to redress private grievances; a State may not invoke this Court's original jurisdiction "to prosecute purely personal claims of [its] citizens." *Pennsylvania v. New Jersey*, 426 U.S. 660, 665 (1976) (per curiam). Rather,

> "a State has standing to sue only when its sovereign or quasi-sovereign interests are implicated and it is not merely litigating as a volunteer the personal claims of its citizens." *Ibid.*

The Special Master concluded that Kansas' suit is no mere expedient by which to raise private grievances of its citizens:

> "Of course, this action is no mere contrivance by Kansas to obtain damages for its water users. Rather, it is the State of Kansas that seeks damages, which it contends should be measured in part by the losses suffered by individual farmers." Second Report 88.

The Special Master added,

> "So long as the suit is not a subterfuge for recovery by individuals on their individual claims, quasi-sovereignty militates against rejection of any relevant evidence of injury." *Id.*, at 101.

Again, the Special Master's conclusion is well grounded in this Court's decisions, including *Texas v. New Mexico* in particular. It is unmistakable from that decision that this Court contemplated a damages remedy based on losses to water users in the plaintiff State, Texas. In reference to the question of who should actually receive such a remedy, this Court acknowledged,

> "It might be said that *those users who have suffered the water shortages* caused by New Mexico's underdeliveries over the years, rather than the State, *should be the recipients of damages* . . . . " 482 U.S., at 131 (emphasis added).

This Court also acknowledged Texas's objection to a monetary remedy on the ground that "a money judgment might find its way into the general coffers of the State, *rather than benefit those who were hurt.*" *Id.*, at 132, n. 7 (emphasis added). This Court ruled, however, that

> "the basis on which Texas was permitted to bring this original action is that enforcement of the Compact was of such general public interest that the sovereign State was a proper plaintiff," *ibid.*,

and that Texas accordingly "should recover any damages that may be awarded, money it would be free to spend in the way it determines is in the public interest." *Ibid.* This is a determination not that the Eleventh Amendment precludes evidence of losses sustained by "users who have suffered the water shortages," but that the plaintiff State is the proper party to seek recovery in the general public interest for a breach of the compact. Referring to *Texas v. New Mexico*, the Special Master in this case concluded, "It is the same situation here. Any damages will

go to the State of Kansas, to be spent as it decides, and not to individual water users." Second Report 89.

Colorado nonetheless insists that Kansas is seeking "to present and enforce individual claims of its citizens." Colorado Brief 9. The Special Master carefully considered and rejected this contention. Unlike the cases on which Colorado relies, Kansas' suit is not a subterfuge for recovery by individuals on their individual claims. Rather, as a sovereign party to the Arkansas River Compact and the representative of the general public interest within Kansas, the State of Kansas is asserting both sovereign and quasi-sovereign interests that it alone can enforce.

Colorado thus misapprehends the nature of Kansas' claim in this suit. Kansas does not purport "to present and enforce individual claims of its citizens," Colorado Brief 9. Rather, Kansas simply seeks to recover the value of the water that Colorado failed to deliver to it at the Stateline. One method of proving that value, and often the only available method, is to determine the value that the water likely would have produced for individual users (as measured in crop yields, for example). Restoration of that value to Kansas is not a recovery on individual claims, but merely a measure of the damages that Kansas itself has suffered as a result of Colorado's breach of the Compact.

As the Special Master correctly recognized, Kansas does not act as a collecting agent for individuals' claims when it asserts its own claim for breach of the Arkansas River Compact. Second Report 88. Kansas brings this action as a sovereign party to the Compact. As such it asserts a *sovereign* interest in enforcing its rights under

the Compact. Kansas' demand for recognition of these rights by another sovereign is an "easily identified" sovereign interest that is properly asserted in this interstate action. *Alfred L. Snapp & Son v. Puerto Rico, ex rel., Barez,* 458 U.S. 592, 601 (1982). The classic example of one State's demand for recognition from another is a border dispute. *Ibid.*; see, *e.g., Rhode Island v. Massachusetts,* 37 U.S. (12 Pet.) 657, 725 (1838). Just as a State may demand another sovereign's recognition of rights in land divided by a border, Kansas here seeks Colorado's recognition of rights in interstate waters divided by the Compact. See *Hinderlider v. La Plata River & Cherry Creek Ditch Co.,* 304 U.S. 92, 106 (1938) (States' authority to apportion waters of interstate stream by compact is equivalent to their authority to adjust State boundaries by compact, which is "a part of the general right of sovereignty") (quoting *Poole v. Fleeger,* 36 U.S. (11 Pet.) 185, 209 (1837)).

" '[A] Compact is, after all, a contract.' " *Texas v. New Mexico,* 482 U.S., at 128 (quoting *Petty v. Tennessee-Missouri Bridge Comm'n,* 359 U.S. 275, 285 (1959) (Frankfurter, J., dissenting)). Kansas is one of the two sovereign parties to that contract, and this Court has stated firmly that it can and will "provide one State a remedy for the breach of another," whether in water or in money. *Id.*, at 128-130. Kansas does not raise private or personal claims of individuals under the Compact for the simple reason that no such claims exist. As the Special Master recognized, Kansas is the party to the Compact while its water users are not. Second Report 103. Indeed, Colorado itself asserts that "Kansas water users do not have a remedy" for Colorado's breach of the Compact. *Id.*, at 100; accord Colorado Brief 23. At Colorado's request, this Court

enjoined Kansas water users from prosecuting individual claims to water in the Arkansas River in the case that formed the basis for the Compact. *Colorado v. Kansas*, 320 U.S. 383, 388, 391 (1943); see Arkansas River Compact, Article II.

The plain language of the Compact similarly establishes that Kansas citizens have no claim to waters of the Arkansas River except under Kansas' authority. The Compact provides that its references to the State of Kansas "shall be construed to include any person" claiming rights to the Arkansas River under the State's authority. Arkansas River Compact, Article VII-A. Moreover, a stated purpose of the Compact was to settle controversies not only between the States of Kansas and Colorado but also "between citizens of one and citizens of the other State." Arkansas River Compact, Article I-A. These terms confirm that Kansas' rights under the Compact subsume the interests of its citizens and that Kansas is the only party that can seek enforcement of those rights and interests.[3]

Colorado contradictorily argues that the Eleventh Amendment does not bar Kansas' remedy as long as the remedy takes the form of water rather than money. Colorado Brief 22; see Second Report 89-90 (observing that

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[3] Colorado argues that although the Compact settles disputes between one State and the other, and between the citizens of one State and the citizens of the other, it does not settle disputes between one State's citizens and the other State. Colorado Brief 21. But this fine parsing of Article I-A ignores the provision in Article VII-A that the term "State" shall be construed to include its water users.

Colorado's proposed water remedy, which would benefit individual water users, is inconsistent with its position on the Eleventh Amendment). Colorado emphasizes, "Water would be delivered *to Kansas*. Delivery to, and benefits to, Kansas water users are matters left to Kansas." Colorado Brief 22 (Colorado's emphasis). Of course, the same is true of money: "Any damages will go to the State of Kansas, to be spent as it decides, and not to individual water users." Second Report 88-89. Kansas merely seeks recovery of the monetary equivalent of the water that, under Colorado's proposal, would be delivered to the Stateline.

Colorado also contends that the applicability of the Eleventh Amendment depends "not on how the state ultimately spends any damages it may recover, but on the nature and origin of the claims on which damages are based." Colorado Brief 19, n. 11. Yet the "nature and origin of the claim" that Kansas asserts are surely the same whether recovery on that claim is in the form of water or money. Kansas' claim has its nature and origin in the Compact and the Eleventh Amendment is no barrier to a monetary remedy for such a claim. *Texas v. New Mexico*, 482 U.S., at 130.

In sum, Colorado wholly ignores Kansas' *sovereign* interest in rectifying Colorado's breach, characterizing Kansas' interests in this case solely as *quasi-sovereign*. Colorado Brief *passim*. Colorado's failure to recognize Kansas' sovereign rights under the Compact leads Colorado to its unfounded assertion that Kansas is overstepping the bounds of its quasi-sovereign interests.

Over and above its sovereign interest in enforcing the Compact, however, Kansas does indeed have quasi-sovereign interests that constitute an adequate and independent basis for the recovery that Kansas seeks. See *Alfred L. Snapp & Son v. Puerto Rico, ex rel., Barez*, 458 U.S., at 601-602 ("[q]uasi-sovereign interests stand apart from" other interests, such as sovereignty, that the State may assert). One of this Court's first decisions to recognize the concept of quasi-sovereignty was *Kansas v. Colorado*, 206 U.S., at 99, which held, in the absence of an interstate compact, that Kansas was entitled to invoke this Court's original jurisdiction over its claim that Colorado had diverted excessive amounts of water from the Arkansas River. The Court explained:

> "In this respect [Kansas] is in no manner evading the provisions of the Eleventh Amendment to the Federal Constitution. It is not acting directly and solely for the benefit of any individual citizen to protect his riparian rights. Beyond its property rights it has an interest as a State in this large tract of land bordering on the Arkansas River. Its prosperity affects the general welfare of the State. The controversy rises, therefore, above a mere question of local private right and involves a matter of state interest, and must be considered from that standpoint. *Georgia v. Tennessee Copper Co.*, decided this day, *post*, p. 230." *Ibid.*

Colorado concedes that here, too, Kansas is not acting *solely* for the benefit of its individual citizens but rather has quasi-sovereign interests that are properly raised. Colorado Brief 9; see Second Report 86-87 & n. 20. Colorado contends, however, that Kansas' remedy cannot be

based in any measure on losses to individual water users. Colorado Brief 9-14. The decision in *Kansas v. Colorado*, 206 U.S. 46, itself is to the contrary. This Court analyzed whether Kansas should receive more water based on population and crop yields in the areas abutting the Arkansas River in the two States. *Id.*, at 108-113. It was precisely the uses made by individual farmers – or the diminution in such uses – that this Court deemed relevant to the issue of whether Kansas was entitled to relief.

This Court reached the same result more explicitly in a series of decisions concerning the apportionment of the Laramie River. *Wyoming v. Colorado*, 259 U.S. 419, modified, 260 U.S. 1 (1922), vacated and new decree entered, 353 U.S. 953 (1957); *Wyoming v. Colorado*, 286 U.S. 494 (1932); *Wyoming v. Colorado*, 298 U.S. 573 (1936); *Wyoming v. Colorado*, 309 U.S. 572 (1940). Under those decisions, a State's interests in the apportionment of an interstate stream are "indissolubly linked" with the interests of its water users, 286 U.S., at 509; 259 U.S., at 468, and the States' rights under the equitable apportionment decree in that proceeding were based on the rights of their water users, 259 U.S., at 468; see 309 U.S., at 579-580. Here, the Special Master reasoned that if evidence of individual uses can be the basis of a decree apportioning water between two States, as in *Wyoming v. Colorado*, it can likewise be the basis of a claim for breach of the Compact apportioning water between two States. Second Report 103.

Colorado seeks to distinguish the Laramie River decisions on the ground that, "[a]lthough the states' apportionments were based on use by their respective water users, they were not the *same* as those individual claims."

Colorado Brief 20 (Colorado's emphasis). But this assertion actually supports the Special Master's recommendation. For although Kansas' claim for damages is *based* (in part) on evidence of the value of water to individuals as a function of the uses that they would make of it, its claim is not the *same* as any individuals' claims. Kansas' rights in the waters of the Arkansas River transcend an aggregation of its citizens' simple property rights. *Kansas v. Colorado*, 206 U.S., at 99; *Georgia v. Tennessee Copper Co.*, 206 U.S. 230, 237 (1907).

The Colorado Brief gives greatest prominence to the decision in *North Dakota v. Minnesota*, 263 U.S. 365 (1923). Colorado Brief 6, 8, 10-12. As the Special Master observed, however, this Court's basis for dismissing North Dakota's claims for damages on behalf of individual farmers was that "recovery was sought for the claimants themselves." Second Report 95. The individual claimants were financing the State's prosecution of the case, each claimant expected to share in any award of damages "in proportion to the amount of his loss," and it was "inconceivable that North Dakota [was] prosecuting this damage feature of its suit without intending to pay over what it thus recover[ed] to those entitled." 263 U.S., at 375. Simply stated, North Dakota was acting as a collecting agent for specific individuals. See Second Report 95.

The other cases on which Colorado principally relies likewise involved a State's prosecution of claims as a collecting agent for identified individuals. In *New Hampshire v. Louisiana*, 108 U.S. 76, 89 (1883), each of two plaintiff States was

> "nothing more nor less than a collecting agent of the owners of the bonds and coupons, and while the suits are in the names of the States, they are under the actual control of individual citizens, and are prosecuted and carried on altogether by and for them."

In *Oklahoma ex rel. Johnson v. Cook*, 304 U.S. 387, 395-396 (1938), the plaintiff State took legal title to claims against the stockholders of a private, insolvent bank as a "mere expedient for the purpose of collection," and the State sought recovery "solely for the benefit of the depositors and creditors of the bank." It was thus determined that each of these suits was improper and should be dismissed.

As the Special Master observed, more recent decisions applying the concept of quasi-sovereignty only strengthen the determination that Kansas may properly seek recovery measured by the harm to its water users. Second Report 97-98 (noting that in recent years "there has been some development of the Court's attitude toward the coupling of private claims with those of a state suing as quasi-sovereign"). In particular, *Maryland v. Louisiana*, 451 U.S., at 739, holds that a State may pursue its claim in an original action when (1) it alleges substantial and serious injury to its proprietary interests, and (2) it seeks to represent a great many citizens who are not "likely" to have the incentive or recourse to assert their claims individually. Here, Colorado does not dispute that Kansas properly seeks relief for injury to its own proprietary rights. Second Report 86-87 & n. 20. Kansas also seeks relief measured in part by the value of water to a great many water users affected by Colorado's admitted

breach of the Compact. Even insofar as such water users can be identified, they "cannot be expected to litigate" individual claims, *Maryland v. Louisiana*, 451 U.S., at 739, for two reasons in this case: (1) Colorado itself contends that they are foreclosed from any judicial recourse in their own right, Second Report 100; Colorado Brief 23; see *Maryland v. Louisiana*, 451 U.S., at 739; and (2) at the request of Colorado, this Court enjoined their predecessors in 1943 from pursuing private actions against Colorado interests for water from the Arkansas River, *Colorado v. Kansas*, 320 U.S., at 388, 391.

Colorado asserts that most quasi-sovereignty decisions have involved claims for injunctive relief rather than damages and that, although an injunction may properly benefit private individuals, damages awardable to a State must neither benefit individuals nor account for harm to them. Colorado Brief 17. After *Maryland v. Louisiana*, however, it is clear that a State may recover damages for harm to its quasi-sovereign interests and that such a recovery may account for economic harm to a State's citizens. This Court upheld several States' damages claims on behalf of citizens who were natural gas consumers, where the States' claims were based on the consumers' payment of an allegedly unconstitutional state tax. *Maryland v. Louisiana*, 451 U.S., at 739. Similarly, as stated above, *Texas v. New Mexico* implicitly approves a State's recovery of damages measured by harm to the water users who have suffered shortages. 482 U.S., at 131-132 & n. 7.

The decision in *Hawaii v. Standard Oil Co.*, 405 U.S. 251 (1972), on which Colorado relies, explicitly disclaims any determination that the Eleventh Amendment bars a

State from seeking damages for harm to its citizens. In holding that Hawaii could not recover damages under the antitrust laws for harm to its citizens, this Court emphasized,

> "The question in this case is not whether Hawaii may maintain its lawsuit on behalf of its citizens, but rather whether the injury for which it seeks to recover is compensable under § 4 of the Clayton Act." *Id.*, at 259.[4]

These decisions go further than is necessary in this case in order to recognize Kansas' claim under the Compact. Kansas does not seek damages owed to its citizens. It does not seek recovery of its citizens' personal claims. Kansas simply seeks to recover as a contracting party "the loss in value to [Kansas] of [Colorado's] performance caused by its failure or deficiency," Restatement (Second) of Contracts § 347(a) (1979), as measured in part

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[4] One law review article on which Colorado relies (authored by counsel for the defendants in several *parens patriae* antitrust suits) declares that States' damages claims on behalf of their citizens "represent a perversion, rather than a consistent development[,] of the concept" of quasi-sovereignty. Malina & Blechman, *Parens Patriae* Suits for Treble Damages under the Antitrust Laws, 65 Nw. U. L. Rev. 193, 223 (1970). But *Maryland v. Louisiana* effectively rejects this view. Another law review article that Colorado cites actually conflicts with Colorado's position because, consistent with *Maryland v. Louisiana*, the article argues that a State may recover damages for harm to its quasi-sovereign interests "when the damage is done to the citizens of a state, but no individual is able to sue because his injuries are not legally recognizable." Comment, State Protection of its Economy & Environment: *Parens Patriae* Suits for Damages, 6 Colum. J. L. & Soc. Prob. 411, 417 (1970); cf. *Maryland v. Louisiana*, 451 U.S., at 739.

by the value that the water would have yielded to water users in Kansas if it had been delivered as promised. The Eleventh Amendment does not impair Kansas' right to a suitable remedy, whether in water or money, for Colorado's breach of the Compact. *Texas v. New Mexico*, 482 U.S., at 130.

II. THE UNLIQUIDATED NATURE OF KANSAS' CLAIM FOR DAMAGES DOES NOT BAR THE AWARD OF PREJUDGMENT INTEREST AS PART OF A COMPLETE REMEDY FOR COLORADO'S BREACH OF THE COMPACT

The timing of performance by Colorado of its duties to deliver water under the Compact is essential: "The critical matter is the amount of divertible flow at times when water is most needed for irrigation." *Kansas v. Colorado*, 514 U.S., at 685. It is therefore appropriate that the Special Master allowed for the possibility of prejudgment interest, recommending:

> "That the unliquidated nature of Kansas' claim for damages does not bar the award of prejudgment interest, whether the remedy includes money damages or water repayment; that the possible award of prejudgment interest will depend upon the evidence presented in future trial proceedings." Second Report 113-114, ¶ 9.

The Special Master supports this recommendation persuasively, Second Report 105-111, noting this Court's observation that "the venerable common-law rule that prejudgment interest is not awarded on unliquidated claims . . . has faced trenchant criticism for a number of years" as stated by this Court in *City of Milwaukee v.*

Cement Div., Nat'l Gypsum Co., 515 U.S. 189, 197 (1995) (footnote omitted); Second Report 106. The Court explained: "The essential rationale for awarding prejudgment interest is to ensure that an injured party is fully compensated for its loss." 515 U.S., at 195.

City of Milwaukee itself serves to refute most of Colorado's arguments. As the Special Master noted, this Court accorded "little weight" to the argument that there was a good faith dispute over liability. 515 U.S., at 196-197; Second Report 109. Likewise, Colorado's arguments that there was a good faith dispute over Compact compliance in this case should also be given little weight. This is consistent with the Court's position that the purpose of prejudgment interest is to compensate the plaintiff for losses suffered rather than to punish the defendant for deliberate wrongdoing or bad faith conduct:

> "If interest were awarded as a penalty for bad faith conduct of the litigation, the City's argument would be well taken. But prejudgment interest is not awarded as a penalty; it is merely an element of just compensation." 515 U.S., at 197.

The Court concluded:

> "In sum, the existence of a legitimate difference of opinion on the issue of liability is merely a characteristic of most ordinary lawsuits. It is not an extraordinary circumstance that can justify denying prejudgment interest." 515 U.S., at 198.

The Special Master also noted the statement by the Court in *City of Milwaukee* that a "*denial* of prejudgment interest would be unfair." Second Report 109 (citing *City*

of Milwaukee, supra, at 199 (emphasis in the Court's opinion)). Thus, while Colorado asserts that imposition of prejudgment interest would be unfair when there is a good faith dispute over liability, *City of Milwaukee* holds that, absent exceptional circumstances, denial of prejudgment interest would itself be unfair.

Although *City of Milwaukee* arose in the admiralty context, its rationale is far broader. As the Court stated, "We have recognized the compensatory nature of prejudgment interest in a number of cases decided outside the admiralty context." 515 U.S., at 195, n. 7 (citations omitted). The Court's first cited example was *West Virginia v. United States,* 479 U.S. 305 (1987), which, like this case, was an action to enforce a contractual obligation against a State. The Court awarded prejudgment interest against West Virginia notwithstanding the absence of a statute authorizing such an award, on the ground that "[p]rejudgment interest is an element of complete compensation." *Id.,* at 310 (citation and footnote omitted). The Court went on to say:

> "Prejudgment interest serves to compensate for the loss of use of money due as damages from the time the claim accrues until judgment is entered, thereby achieving full compensation for the injury those damages are intended to redress." *Id.,* at 310, n. 2.

As the Special Master points out, the trend away from the rule barring interest on unliquidated damages is clear: "[T]he compensatory rationale for prejudgment interest has emerged as the dominant principle." Second Report 109-110. Following *West Virginia v. United States,* Judge Posner stated:

> "The areas in which interest is allowed . . . are diverse. The time has come, we think, to generalize, and to announce a rule that prejudgment interest should be presumptively available to victims of federal law violations. Without it, compensation of the plaintiff is incomplete and the defendant has an incentive to delay." *Gorenstein Enters., Inc. v. Quality Care-USA, Inc.,* 874 F.2d 431, 436 (7th Cir. 1989).

As the Special Master noted, courts have recognized that, if prejudgment interest is not awarded, the defendant may have an incentive to delay payment. Second Report at 107 (citing D. Dobbs, Law of Remedies § 3.6(3) (2d ed. 1993); accord *In re Oil Spill by the Amoco Cadiz,* 954 F.2d 1279, 1332 (7th Cir. 1992) (per curiam) ("An injurer allowed to keep the return on this money has profited by the wrong.").

Colorado makes several additional arguments against an award of prejudgment interest. First it suggests that there must be a clear obligation to pay prejudgment interest before this Court should award it. Colorado Brief 24. Colorado's position seems to be that, if the Compact does not expressly state that interest will be due for violations of the Compact, then no such interest should be allowed. Such an approach to the interpretation and enforcement of interstate compacts would be contrary, however, to the jurisprudence of this Court. In *Texas v. New Mexico,* 482 U.S. 124 (1987), the Court stated, with regard to enforcement of the Pecos River Compact:

> "A court should provide a remedy if the parties intended to make a contract and the contract's terms provide a sufficiently certain basis for determining both that a breach has in fact

> occurred and the nature of the remedy called for. Restatement (Second) of Contracts § 33(2), and Comment *b* (1981)." 482 U.S., at 129.

Significantly, the Court then went on to hold that the absence from the Pecos River Compact of any explicit remedy provision, let alone a specific provision authorizing money damages, did not preclude the Court from providing not only a remedy but a remedy in money damages (if "fair and equitable") for past violations of the Pecos River Compact. Likewise, awarding prejudgment interest as part of those money damages is well within the Court's "complete judicial power . . . to provide one State a remedy for the breach of another." *Id.*, at 128.

Colorado also criticizes the Special Master's reliance on cases involving statutory awards of prejudgment interest. Colorado Brief 25. But as the Court said in *City of Milwaukee*:

> "Far from indicating a legislative determination that prejudgment interest should not be awarded, however, the absence of a statute merely indicates that the question is governed by traditional judge-made principles." 515 U.S., at 194.

Moreover, this Court has already approved an award of prejudgment interest on a contractual obligation in an action against a State in the absence of a statute authorizing such interest. In *West Virginia v. United States, supra*, this Court approved the award of prejudgment interest against the State of West Virginia, saying,

> "In the absence of an applicable federal statute, it is for the federal courts to determine, according to their own criteria, the appropriate measure of damage, expressed in terms of interest, for nonpayment of the amount found to be due." 479 U.S., at 308-309 (citations omitted).

In *West Virginia*, the Court noted that the state law of the defendant State allowed prejudgment interest. 479 U.S., at 312, n. 5. Similarly here, although it is not controlling, Colorado law itself recognizes that interest is necessary to provide a complete remedy and that prejudgment interest may be awarded even on unliquidated claims. See, *e.g.*, *Davis Cattle Co. v. Great Western Sugar Co.*, 393 F. Supp. 1165, 1181-1195 (D. Colo. 1975) (applying Colorado law), aff'd, 544 F.2d 436, 441-442 (10th Cir. 1976), cert. denied, 429 U.S. 1094 (1977). More recently, the Colorado Supreme Court has stated: "When a Court appropriately applies the doctrine of unjust enrichment, the unjustly enriched party is generally liable for interest on the benefits received." *Martinez v. Continental Enters.*, 730 P.2d 308, 317 (Colo. 1986) (citing D. Dobbs, Law of Remedies § 3.5 (1973)); see also Rothschild, Prejudgment Interest: Survey and Suggestion, 77 Nw. U. L. Rev. 192, 204-206 & nn. 74-76, 80 (1982). Colorado statutes now *require* prejudgment interest to be paid for property wrongfully withheld whether the amount is liquidated or not. Colo. Rev. Stat. § 5-12-102 (1973). The State itself is subject to this rule when it is a defendant in its own courts. *Wilkerson v. State*, 830 P.2d 1121, 1127 (Colo. App. 1992). Thus, although Colorado urges this Court not to "cast aside" the rule against awarding prejudgment interest on unliquidated claims, Colorado Brief 26, Colorado itself has already done so for cases brought under Colorado law.

In sum, this Court has stated a broad rationale for awarding prejudgment interest whether or not the underlying claim is liquidated. Consistent with this rationale, the Special Master noted that "a majority of jurisdictions reject the strict, traditional approach to awarding prejudgment interest." Second Report 107 (citing Rothschild, *supra*, at 204). The Court should apply the same rationale in this case.

III. COLORADO'S PREDICTIONS OF "FAR-REACHING AND UNINTENDED CONSEQUENCES" ARE UNFOUNDED

Colorado concludes its Brief by predicting a string of "far-reaching and unintended consequences," including the following: (1) an unprecedented expansion of the concept of quasi-sovereignty; (2) increased interstate litigation; (3) decreased resolution of interstate disputes through mutual accommodation and agreement; (4) increased risk of double recoveries; and (5) increased delay in enforcing interstate compacts. Colorado Brief 27-30. Each of these predictions is unfounded.

The prediction of an "unprecedented expansion of the concept of quasi-sovereignty" is simply a restatement of Colorado's erroneous position on quasi-sovereignty. Like the rest of the Colorado Brief, it misses the point that Kansas is seeking to enforce its sovereign rights under the Compact, not merely its quasi-sovereign interests. Colorado argues that, if the Court overrules its exceptions, litigation between States in this Court would be encouraged by "opening the door to recovery for losses to individuals." Colorado Brief 29. But Kansas is not

pressing its quasi-sovereign rights to recover "losses to individuals." Rather, Kansas seeks the appropriate remedy, that is, a complete remedy, for the losses to the State of Kansas caused by Colorado's breach of its obligations to the State of Kansas under the Compact. Indeed, this Court has emphasized the need to afford a State a remedy for past breaches of an interstate water allocation compact. *Texas v. New Mexico*, 482 U.S. 124, 128 (1987). Moreover, as explained above, allowing recovery for the actual losses of citizens would be within the accepted doctrine of quasi-sovereignty as set out in *Maryland v. Louisiana*, 451 U.S. 725, 739 (1981).

Colorado further asserts that formation of compacts will be discouraged by a result that would expand the effect of the Arkansas River Compact beyond its terms for a violation which was not deliberate or willful, and for which no statute of limitations has been recognized. Colorado Brief 28-29. But under essentially similar circumstances the Court answered a similar argument from New Mexico in the Pecos River litigation as follows:

> "[G]ood-faith differences about the scope of contractual undertakings do not relieve either party from performance. . . . There is often a retroactive impact when courts resolve contract disputes about the scope of a promisor's undertaking; parties must perform today or pay damages for what a court decides they promised to do yesterday and did not. In our view, New Mexico cannot escape liability for what has been adjudicated to be past failures to perform its duties under the Compact." *Texas v. New Mexico*, 482 U.S. 124, 129 (1987).

What Colorado is trying to do is exactly what this Court would not allow New Mexico to do, that is, to escape the lion's share of liability for past failures to deliver water as required under an interstate compact. In *Texas v. New Mexico*, the Court rejected a notion similar to that proposed here by Colorado:

> "We find no merit in [New Mexico]'s submission that we may order only prospective relief, that is, requiring future performance of compact obligations without a remedy for past breaches. If that were the case, New Mexico's defaults could never be remedied. . . . [A] Compact when approved by Congress becomes a law of the United States, but '[a] Compact is, after all, a contract.' It remains a legal document that must be construed and applied in accordance with its terms." 482 U.S., at 128 (citations omitted).

When Colorado entered into the Arkansas River Compact, it fully realized the solemn nature of the obligations it was undertaking. Ten years before the Arkansas River Compact negotiations were completed, this Court said:

> "Whether the apportionment of the water of an interstate stream be made by compact between the upper and lower States with the consent of Congress or by a decree of this Court, *the apportionment is binding upon the citizens of each State and all water claimants*, even where the State had granted the water rights before it entered into the compact." *Hinderlider v. La Plata River & Cherry Creek Ditch Co.*, 304 U.S. 92, 106 (1938).

The *Hinderlider* case was decided some five years before the decision in *Colorado v. Kansas*, 320 U.S. 383 (1943), which contained the suggestion to the States of Colorado

and Kansas that they resolve the equitable apportionment of the Arkansas River through compact negotiations. *Id.*, at 392 (citing, *inter alia*, *Hinderlider v. La Plata River & Cherry Creek Ditch Co.*). Shortly thereafter, compact negotiations were undertaken by Colorado and Kansas, and the Arkansas River Compact was agreed to by the negotiators in 1948 and approved by the legislatures and Congress in 1949. 1949 Colo. Sess. Laws 485, § 1, codified at Colo. Rev. Stat. § 37-69-101 (1973); 1949 Kan. Sess. Laws 829, codified at Kan. Stat. Ann. § 82a-520 (1989); Act of Congress of May 31, 1949, 63 Stat. 145. Thus, Colorado had unmistakable notice that this Court would enforce interstate compacts. That notice came from a case involving Colorado itself – Mr. Hinderlider was the Colorado State Engineer. *Hinderlider*, 304 U.S., at 95. Further, if interstate compacts were essentially unenforceable, as Colorado, an upstream State, would seem to prefer, there would be no incentive to undertake the substantial effort on behalf of the States and Congress in negotiating such compacts.

When the auditor of the State of West Virginia refused to issue a warrant for payment of that State's contribution required to be paid under the Ohio River Valley Water Sanitation Compact, 54 Stat. 752 (1940), the controversy was brought to this Court, where it was resolved against West Virginia. The Court stated:

> "But a compact is after all a legal document. Though the circumstances of its drafting are likely to assure great care and deliberation, all avoidance of disputes as to scope and meaning is not within human gift. Just as this Court has power to settle disputes between States where

there is no compact, it must have final power to pass upon the meaning and validity of compacts. *It requires no elaborate argument to reject the suggestion that an agreement solemnly entered into between States by those who alone have political authority to speak for a State can be unilaterally nullified,* or given final meaning by an organ of one of the contracting States. A State cannot be its own ultimate judge in a controversy with a sister State. To determine the nature and scope of obligations as between States, whether they arise through the legislative means of compact or the 'federal common law' governing interstate controversies, is the function and duty of the Supreme Court of the Nation." *West Virginia ex rel. Dyer v. Sims*, 341 U.S. 22, 28 (1951) (emphasis added).

The Court thus required West Virginia to remedy past failure to comply with the Ohio River Valley Water Sanitation Compact, including payment of money, just as Colorado should be required to comply with the Arkansas River Compact.

Colorado received substantial benefits from entering into the Arkansas River Compact, including the benefits to Colorado "arising from the construction, operation and maintenance by the United States of John Martin Reservoir Project for water conservation purposes." Arkansas River Compact, Article I-B; see, *e.g.*, First Report 87 ("Absent an agreement between the states, the Corps of Engineers intended to release [conservation storage water from John Martin Reservoir]."). Colorado enjoys many benefits on the Arkansas River which are protected by the Arkansas River Compact, but it must also recognize and

comply with its rightful obligations under that same Compact.

Colorado asserts that States are seeking to vindicate quasi-sovereign interests "with increasing frequency" in suits against defendants other than States, and that an increased risk thus exists that such defendants will be exposed to double liability. Colorado Brief 27. While the five lower-court cases over two decades cited by Colorado hardly represent an opening of the floodgates of litigation, Colorado's asserted concerns about the risk of double recoveries are irrelevant in any event to the questions presented here. As the Special Master recognized, Colorado itself contends that Kansas water users are foreclosed from asserting individual claims against Colorado, thus eliminating any such risk in this case. Second Report 100; Colorado Brief 23. Colorado fails to address the Special Master's observation that this Court enjoined, at Colorado's request, the assertion of claims by Kansas farmers against Colorado interests on the Arkansas River. Second Report 100; *Colorado v. Kansas*, 320 U.S. 383, 400 (1943).

Colorado fears that States will be deterred from entering into compacts by the prospect of "potentially enormous damages." Colorado Brief 29. It also suggests that States will be encouraged both to litigate (*i.e.*, to seek too much enforcement) and, contradictorily, to delay litigation (*i.e.*, to seek too little enforcement). *Ibid.*

These fears are belied by the very purpose of contract law. Contract law provides a remedy for breach, ranging from the enormous to the merely nominal, precisely in

order to facilitate commercial relations. "Market efficiency requires effective means to enforce private agreements." *American Airlines, Inc. v. Wolens*, 513 U.S. 219, 230 (1995). Thus, it is Colorado's urging to withhold critical components of a complete remedy, not the Special Master's recognition of the need for such a remedy, that would upset the stability of a contractual relationship and would ultimately deter its formation.

> "[Contract law's] basic function is to provide a sanction for reneging, which, in the absence of sanctions, is sometimes tempting where the parties' performance is not simultaneous. . . . The problem arises because the nonsimultaneous character of the exchange offers one of the parties a strategic advantage which he can use to obtain a transfer payment that utterly vitiates the advantages of the contract to the other party. *Clearly, if such conduct were permitted, people would be reluctant to enter into contracts and the process of economic exchange would be retarded.*" A. Kronman & R. Posner, The Economics of Contract Law 4 (1979) (emphasis added).

As for the notion that a complete remedy would encourage too much or too little enforcement, a basic principle of contract law is that the optimal level of enforcement is precisely that which results in a complete remedy for a breach. An interstate compact, as a species of contract, should be enforced in accordance with its terms, *Texas v. New Mexico*, 482 U.S., at 128, because "[a] remedy confined to a contract's terms simply holds parties to their agreements." *American Airlines, Inc. v. Wolens*, 513 U.S., at 229.

CONCLUSION

The State of Kansas respectfully requests that the Court accept the Second Report of the Special Master, overrule Colorado's Exceptions, and remand the case to the Special Master for proceedings not inconsistent with the Second Report and the Opinion of the Court.

Respectfully submitted this 22nd day of December, 1997,

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In the Supreme Court of the United States

OCTOBER TERM, 1997

STATE OF KANSAS, PLAINTIFF

v.

STATE OF COLORADO

ON EXCEPTIONS TO THE SECOND REPORT OF THE SPECIAL MASTER

BRIEF FOR THE UNITED STATES IN OPPOSITION TO THE EXCEPTIONS OF COLORADO

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QUESTIONS PRESENTED

The United States will address the following issues:

1. Whether the Special Master erred in recommending that, if the remedy in this case includes money damages, the Eleventh Amendment does not preclude damages to the State of Kansas from being based, in part, on losses incurred by its water users, subject to the overall consideration of fairness (Colorado Exception No. 1).

2. Whether the Special Master erred in recommending that the unliquidated nature of Kansas's claim for money damages or repayment in water does not bar the award of prejudgment interest and that the possible award of prejudgment interest will depend upon the evidence presented in future trial proceedings (Colorado Exception No. 2).

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In the Supreme Court of the United States

OCTOBER TERM, 1997

No. 105, ORIGINAL

STATE OF KANSAS, PLAINTIFF

v.

STATE OF COLORADO

ON EXCEPTIONS TO THE SECOND REPORT OF THE SPECIAL MASTER

BRIEF FOR THE UNITED STATES IN OPPOSITION TO THE EXCEPTIONS OF COLORADO

STATEMENT

The State of Kansas brought this original action against the State of Colorado to resolve disputes under the Arkansas River Compact, Act of May 31, 1949, ch. 155, 63 Stat. 145 (Compact). This Court granted Kansas leave to file its complaint, *Kansas* v. *Colorado*, 475 U.S. 1079 (1986), and the Court appointed the Honorable Wade H. McCree, Jr., to serve as the Special Master. 478 U.S. 1018 (1986). Upon Judge McCree's death, the Court appointed Arthur L. Littleworth as the Special Master, 484 U.S. 910 (1987). Special Master Littleworth granted the United States' unopposed motion for leave to intervene in the action, conducted a trial limited to

questions of liability, and submitted a report recommending that the Court find Colorado to have violated the Compact in certain respects. 513 U.S. 803 (1994). This Court overruled the exceptions of both Kansas and Colorado to the Master's first report. 514 U.S. 673 (1995).

The Master has submitted a second report that addresses preliminary issues respecting a remedy, and this Court has invited the parties to file exceptions. 118 S. Ct. 39 (1997). The United States actively participated in the trial of the liability issues, but has not participated in the trial of remedy issues. Like Kansas, the United States has not filed exceptions to the Master's second report. The United States nevertheless remains a party to this dispute and continues to monitor the progress of this case. The United States files this brief to provide this Court with the federal government's perspective on Colorado's exceptions to the Master's second report.

1. The Arkansas River Basin

The Arkansas River originates on the east slope of the Rocky Mountains in central Colorado and flows south and then east across Colorado and into Kansas. It receives significant in-flows from the Purgatoire River, its major tributary in Colorado, which originates in the Sangre de Cristo mountains in southern Colorado near the New Mexico border. The Purgatoire River flows in a northeasterly direction to join the Arkansas River about 60 miles west of the Kansas border, at Las Animas, Colorado. See *Kansas* v. *Colorado*, 514 U.S. 673, 675-676 (1995).

The United States has constructed three water storage projects on this river system that are relevant to this case. The John Martin Reservoir, located

immediately east of the juncture of the Purgatoire and Arkansas Rivers in Colorado, is operated by the Army Corps of Engineers to control floods and to provide storage water in accordance with the Arkansas River Compact. It has a storage capacity of approximately 700,000 acre-feet. 514 U.S. at 677. The Pueblo Reservoir, located on the Arkansas River about 150 miles upstream of the Kansas border near Pueblo, Colorado, is managed by the Department of the Interior's Bureau of Reclamation as part of the Fryingpan-Arkansas Project. It has a storage capacity of approximately 357,000 acre-feet. *Ibid.* The Trinidad Reservoir, located on the Purgatoire River near Trinidad, Colorado, is jointly managed by the Army Corps of Engineers and the Bureau of Reclamation to control floods and to provide storage water for use by the Bureau of Reclamation's Trinidad Project. It has a storage capacity of approximately 114,000 acre-feet. *Ibid.*

Twenty-three canal systems in Colorado divert water from the Arkansas River for irrigation. Fourteen of those systems are located upstream from John Martin Reservoir, and four of those systems have associated privately-owned, off-channel water storage facilities. Six canal systems in Kansas operate between the Colorado border and Garden City. See 514 U.S. at 677.

2. The Arkansas River Compact

The Arkansas River Compact apportions the Arkansas River between the States of Kansas and Colorado. The Compact was an outgrowth of two original actions that the States had filed in this Court disputing their respective entitlements to use of the Arkansas River. See 514 U.S. at 678. In each of those

cases, the Court denied Kansas's request for an equitable apportionment. See *Colorado* v. *Kansas*, 320 U.S. 383, 391-392 (1943); *Kansas* v. *Colorado*, 206 U.S. 46, 114-117 (1907).

In the first suit, Kansas sought to enjoin water diversions in Colorado, but the Court denied relief on the ground that Colorado's depletions of the Arkansas River were insufficient at that time to warrant injunctive relief. *Kansas* v. *Colorado*, 206 U.S. at 114-117. In the second suit, Colorado sought to enjoin lower court litigation brought by Kansas water users against Colorado water users, while Kansas sought an equitable apportionment of the Arkansas River. The Court concluded that Colorado was entitled to the injunction it sought, but the Court concluded once again that Kansas had failed to show sufficient injury to warrant an equitable apportionment of the Arkansas River. *Colorado* v. *Kansas*, 320 U.S. at 391-392; see *Kansas* v. *Colorado*, 514 U.S. at 678.

In denying Kansas's second request for judicial relief, the Court suggested that a dispute such as this one calls for "expert administration rather than judicial imposition of a hard and fast rule," and that the controversy "may appropriately be composed by negotiation and agreement, pursuant to the compact clause of the federal Constitution." *Colorado* v. *Kansas*, 320 U.S. at 392. Shortly thereafter, the States appointed commissioners to negotiate an interstate agreement. In 1949, the States approved, and Congress ratified, the Arkansas River Compact, 63 Stat. 145. See generally Colo. Br. App. 1-17 (reprinting text of Compact). The Compact was intended to "[s]ettle existing disputes and remove causes of future controversy" between the States and

their citizens over the use of the Arkansas River. To that end, the Compact was designed to

> [e]quitably divide and apportion between the States of Colorado and Kansas the waters of the Arkansas River and their utilization as well as the benefits arising from the construction, operation and maintenance by the United States of John Martin Reservoir Project for water conservation purposes.

Compact Art. I, 63 Stat. 145; Colo. Br. App. 1-2. The Compact accomplishes those goals through two basic mechanisms.

First, the Compact protects the States' respective rights to continued use of the Arkansas River through a limitation on new depletions. Article IV-D of the Compact allows new development in the form of dams, reservoirs, and other water-utilization works in Colorado and Kansas, provided that the "waters of the Arkansas River" are not thereby "materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact." 63 Stat. 147; Colo. Br. App. 5. The Compact defines the term "waters of the Arkansas River," Art. III-B, 63 Stat. 146; Colo. Br. App. 2-3, but it does not expressly define what constitutes a "material" depletion or a "usable" quantity.[1]

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[1] The full text of Article IV-D states as follows:

> D. This Compact is not intended to impede or prevent future beneficial development of the Arkansas River basin in Colorado and Kansas by Federal or State agencies, by private enterprise, or by combinations thereof, which may involve construction of dams, reservoir, and other works for the purposes of water utilization and control, as well as the improved or prolonged functioning of existing works:

Second, the Compact regulates the storage of water at John Martin Reservoir and specifies the criteria by which each State is entitled to call for water releases. Article V of the Compact, which provides the "basis of apportionment of the waters of the Arkansas River," prescribes the timing of storage at the reservoir and the release criteria. 63 Stat. 147-149; Colo. Br. App. 5-9. Basically, between November 1 and March 31, inflows to the John Martin Reservoir are stored, subject to Colorado's right to demand a limited amount of water. Between April 1 and October 31, the storage of water is largely curtailed, and either State may call for releases at any time in accordance with the flow rates set out in the Compact. *Ibid.*

The Compact creates an interstate agency, the Arkansas River Compact Administration, to administer the Compact. Art. VIII, 63 Stat. 149-151; Colo. Br. App. 11-15. The Compact Administration consists of a non-voting presiding officer designated by the President of the United States and three voting representatives from each State. It is empowered to adopt bylaws, rules, and regulations, prescribe procedures for the administration of the Compact, and perform functions to implement the Compact. See Arts. VIII-B, VIII-C, 63 Stat. 149, 150; Colo. Br. App. 11, 12. Article VIII-H of the Compact directs that the Administration shall "promptly investigate[]" violations of the Compact and report its findings and recommendations

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Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction.

63 Stat. 147; Colo. Br. App. 5.

to the appropriate state official. 63 Stat. 151; Colo. Br. App. 15. That Article further states that it is "the intent of this Compact that enforcement of its terms shall be accomplished in general through the State agencies and officials charged with the administration of water rights." *Ibid.*

3. The Current Proceedings

Kansas brought this action in 1985 to enforce the provisions of the Arkansas River Compact. Special Master Littleworth filed his initial report with the Court in July 1994 addressing issues of liability. He recommended that the Court find that post-Compact well pumping in Colorado had violated Article IV-D of the Compact and that Colorado be held liable for that violation. The Master also recommended that the Court find no violation of the Compact with respect to Kansas's claims arising from the operation of the Trinidad Reservoir and the Winter Water Storage Program. The Court adopted all of the Master's recommendations and remanded for determination of the unresolved issues—primarily relating to what remedy, if any, Kansas was entitled to as a result of Colorado's breach—in a manner not inconsistent with the Court's opinion. *Kansas* v. *Colorado*, 514 U.S. at 694.

On remand, the Master conducted further proceedings and prepared a report providing his preliminary recommendations on the issues of: (a) quantifying the depletions in Stateline flow for the period 1950-1985; (b) quantifying depletions for the period subsequent to 1985; (c) bringing Colorado into current compliance with the provisions of the Compact; and (d) a remedy for past depletions. See Rep. 2, 112. After hearing evidence and receiving briefs addressing those issues,

the Master issued his second report, which recommends, in essence, that:

(1) the Court approve the Master's order denying Kansas' motion for an injunction;

(2) the Court approve the States' stipulation quantifying depletions to usable Stateline flow caused by post-Compact pumping in Colorado for the period 1950-1985 in the amount of 328,505 acre-feet;

(3) depletions of usable Stateline flow for the period 1986-1994 be determined to be 91,565 acre-feet;

(4) Colorado's efforts to bring the State into current compliance with its Compact obligations have been sufficient to preclude any immediate need for interim injunctive relief or revision of Colorado's Measurement or Use Rules, that Colorado's activities in those regards continue to be closely monitored, and that depletions for 1995 and compliance for 1996 and subsequent years be determined;

(5) the Court approve an Offset Account in John Martin Reservoir for the storage and delivery of replacement water to Kansas to offset depletions of usable Stateline flow;

(6) evidence be received on a suitable remedy for past Compact violations, whether such remedy be in water or in money;

(7) if a suitable remedy in this case should include money damages, those damages should be based upon Kansas's loss rather than upon any gain to Colorado, subject to the overriding consideration that the remedy provide a fair and equitable solution;

(8) if the remedy includes money damages, the Eleventh Amendment does not preclude damages to Kansas from being based, in part, on losses incurred by its water users, again subject to the overall consideration of fairness; and

(9) the unliquidated nature of Kansas's claim for damages does not, in and of itself, bar the award of prejudgment interest, whether the remedy includes money damages or water repayment, and the possible award of prejudgment interest will depend upon the evidence presented in future trial proceedings.

See Rep. 112-114. The Court has invited the parties to file exceptions to the recommendations contained in the Master's report. See 118 S. Ct. 39 (1997).

INTRODUCTION AND SUMMARY OF ARGUMENT

The State of Kansas brought this action to enforce its rights under the Arkansas River Compact, which apportions the flow of the Arkansas River between Kansas and Colorado. This Court resolved the issues of liability in an earlier decision, *Kansas* v. *Colorado*, 514 U.S. 673 (1995), which accepted the Master's recommendation that Colorado be held liable for violations of Article IV-D of the Compact resulting from post-Compact well pumping in Colorado. On remand, the Master heard evidence and prepared a thorough report dealing with a series of issues related to what remedy Kansas may obtain as a result of Colorado's breach.

Among the Master's recommendations, Colorado takes exception to only two. Colorado challenges the

Master's determinations that (1) if Kansas is entitled to a remedy and that remedy is money damages, the Eleventh Amendment does not bar the Master from recommending a damage award that is based, in part, on evidence of the actual losses suffered by individual Kansas water users as a result of Colorado's Compact violations; and (2) if Kansas is entitled to a remedy, the Master may recommend an award of prejudgment interest if the evidence produced in future proceedings suggests that such an award is warranted. Colo. Excepts. 1-2; see Colo. Br. 6-7. Colorado's exceptions should be overruled without prejudice to Colorado's right to renew those exceptions, if necessary, once the Master has recommended a final remedy in this case.

I. The resolution of Colorado's Eleventh Amendment challenge should await completion of the remedial proceedings. The Master's recommendation concerning the use of evidence of losses sustained by individual Kansas water users has uncertain significance at this stage of the remedial proceedings. The Master has merely recommended that, *if* Kansas is entitled to a remedy and *if* the appropriate remedy is money damages, he may consider evidence of losses sustained by individual Kansas water users in determining the amount of damages to which Kansas is entitled. If the Master ultimately concludes that Kansas is entitled to no remedy or that the appropriate remedy should take the form of replacement water rather than money damages, and the Court adopts those recommendations, then there would be no reason to decide Colorado's constitutional objections. On the other hand, if the Master determines that a monetary award is appropriate, and the Master imposes a remedy that raises Eleventh Amendment concerns,

the issue can be resolved at that time in the context of the specific remedy that the Master proposes.

The Court should be particularly reluctant to resolve Colorado's exception at this time because that exception rests on what appears to be an inaccurate interpretation of the Master's recommendation. Colorado characterizes the Master's recommendation as allowing Kansas to recover from Colorado the actual losses suffered by individual Kansas water users. The Master's report, however, suggests instead that the Master has simply concluded that evidence concerning individual loss may be relevant in determining the injury that Kansas has suffered to its quasi-sovereign interest in protecting the economic well-being of its citizens. If the Master ultimately uses individual losses in some other way to quantify Kansas's damages, the Court will have ample opportunity to address any Eleventh Amendment concerns in the course of its review of the Master's final remedy. The Court should therefore overrule Colorado's exception without prejudice to Colorado's renewing that exception, if necessary, at the conclusion of the remedial proceedings.

II. The resolution of Colorado's challenge to the possible award of prejudgment interest should also await completion of the remedial proceedings. The Master's recommendation on that matter similarly has uncertain significance at this stage of the proceedings, and Colorado's exception presents the same possibility of premature and piecemeal consideration. The Master provided sound reasons for his determination that he has discretion to recommend an award of prejudgment interest in appropriate cases. The relevance of that ruling, however, depends, as a threshold matter, on whether the Master ultimately determines

that Kansas is entitled to a remedy. In addition, the Master emphasized that "the possible award of prejudgment interest will depend upon the evidence presented in future trial proceedings." Rep. 114. In light of the current uncertainties, the Court should overrule Colorado's exception without prejudice to Colorado's renewal of that exception, if necessary, after the Master has recommended a final remedy.

ARGUMENT

COLORADO'S EXCEPTIONS SHOULD BE OVERRULED WITHOUT PREJUDICE BECAUSE THEY ARE NOT APPROPRIATE FOR RESOLUTION AT THIS STAGE OF THE MASTER'S PROCEEDINGS

This Court has considerable latitude in the conduct of original proceedings. In most instances, the Court appoints a Special Master, who controls the scope of trial proceedings and submits a report at the conclusion of those proceedings setting forth his recommendations respecting issues of fact and law. In complex cases, the Master may choose to submit reports at intermediate stages of the litigation. In this case, the Master has submitted a report at an intermediate phase of the remedial proceedings to set out his intended course in determining a remedy.

We suggest that this Court should overrule Colorado's exceptions to the Master's recommendations without prejudice to renewal at the conclusion of the remedial phase. Colorado's challenges have uncertain importance at this stage of the proceedings. This Court's resolution of those issues might provide the parties with greater certainty in the progress of this particular case, but it would thrust the Court into the position of deciding important issues conclusively—

and perhaps unnecessarily—without the benefit of the Master's final recommendation on an appropriate remedy. The Master's proposed approach to fashioning a remedy appears sound, and this Court should therefore postpone review until the Master has recommended a specific remedy, which may either eliminate the current controversies or sharpen the precise issues in dispute.

I. COLORADO'S ELEVENTH AMENDMENT CHALLENGE IS NOT RIPE FOR CONCLUSIVE RESOLUTION BY THIS COURT

Colorado challenges (Br. 7-24) the Special Master's recommendation that, if money damages are awarded to Kansas, the amount of damages may be based, in part, on evidence of the injury to Kansas's individual water users as a result of Colorado's breach. Colorado specifically relies on the Eleventh Amendment, which bars the federal courts from hearing suits "commenced or prosecuted against one of the United States by Citizens of another State." U.S. Const. Amend. XI. According to Colorado, the Master's consideration of individual losses transforms Kansas's suit against Colorado from a suit between two sovereign States, over which this Court has original jurisdiction, to a suit between individual citizens of Kansas and the sovereign State of Colorado, which would be barred by the Eleventh Amendment. Colorado's exception should be overruled because it is premature and because it rests on an unwarranted interpretation of the Master's recommendation.

A. Colorado asks this Court to resolve definitively a constitutional issue that has uncertain importance at this stage of the proceedings. That request is contrary to this Court's settled practice:

"'If there is one doctrine more deeply rooted than any other in the process of constitutional adjudication, it is that we ought not to pass on questions of constitutionality . . . unless such adjudication is unavoidable.' *Spector Motor Service v. McLaughlin*, 323 U.S. 101, 105 (1944). It has long been the Court's 'considered practice not to decide abstract, hypothetical or contingent questions . . . or to decide any constitutional question in advance of the necessity for its decision . . . or to formulate a rule of constitutional law broader than is required by the precise facts to which it is to be applied . . . or to decide any constitutional question except with reference to the particular facts to which it is to be applied. . . . .'" *Alabama State Federation of Labor v. McAdory*, 325 U.S. 450, 461 (1945).

Clinton v. *Jones*, 117 S. Ct. 1636, 1642 n.11 (1997) (quoting *Rescue Army* v. *Municipal Court of Los Angeles*, 331 U.S. 549, 570 n.34 (1947)) (parallel citations omitted).

The main issue currently before the Master is what remedy, if any, Kansas should receive as a result of Colorado's breach of the Compact. This Court ruled in *Texas* v. *New Mexico*, 482 U.S. 124 (1987), that, where an interstate compact does not specify the appropriate remedy for a breach, the Court has discretion to award "a suitable remedy, whether in water or money." *Id.* at 130. In this case, Kansas advocates a remedy of money damages, while Colorado advocates a remedy in the form of "make-up water." See Rep.

72-74. The Master has not determined which remedy is appropriate. Rep. at 113.

In progressing toward resolution of that issue, the Master has made uncontested final recommendations regarding the levels of depletions of usable Stateline flow caused by Colorado's breach during the periods of 1950-1985 and 1986-1994. Rep. 11, 46 (setting depletions for 1950-1985 at 328,505 acre-feet and for 1986-1994 at 91,565 acre-feet). Stateline depletions, however, do not necessarily result in compensable injuries. Kansas is entitled to damages only if those depletions actually caused injury to Kansas. The Master concluded that, if he chooses to award money damages, the Eleventh Amendment would not bar him from determining Kansas's damages based, in part, on evidence of injury to the State's water users. See Rep. 85-104, 113.

In light of this Court's established policy against deciding abstract, hypothetical, or contingent issues, the Court should not conclusively resolve Colorado's Eleventh Amendment challenge to the Master's proposed course of action at this time. If the Master ultimately recommends that Kansas is not entitled to a remedy or that the remedy should take the form of replacement water, and the Court agrees with that recommendation, there will be no need to resolve Colorado's constitutional challenge.[2] And if the Master ultimately recommends that Kansas is entitled to money damages, Colorado will be free to challenge the Master's method of calculating those damages at that time. There is no pressing need for the Court to

[2] Colorado concedes (Br. 22) that the Eleventh Amendment would not preclude this Court from awarding replacement water to Kansas.

resolve the constitutional issue unless and until the Master recommends a final remedy that squarely presents the question in a concrete setting.[3]

B. This Court should be particularly reluctant to resolve Colorado's exception because it rests on an unwarranted interpretation of the Master's recommendation. Colorado characterizes the Master's recommendation as allowing Kansas to recover, on behalf of individual Kansas water users, the actual losses suffered by those citizens. See, *e.g.*, Colo. Br. 6, 9. We read the Master's report to suggest a more limited use of individual-loss evidence. The Master carefully articulated the distinction between suits in which a State sues as a trustee for individual citizens and suits in which a State sues as parens patriae. His analysis indicates that he is sensitive to the limitations that the Eleventh Amendment imposes in suits brought under this Court's original jurisdiction. See Rep. 85-98.

The Eleventh Amendment provides in relevant part that "[t]he Judicial power of the United States shall not be construed to extend to any suit in law or equity, commenced or prosecuted against one of the

[3] See *Illinois* v. *Kentucky*, 500 U.S. 380, 389 (1991) (rejecting as "premature" Kentucky's exception regarding the location of the low-water mark of the Ohio River because of the need for further recommendations by the Special Master); *United States* v. *Louisiana*, 485 U.S. 88, 92-93 (1988) (overruling Mississippi's exceptions to Special Master's Report without prejudice to allow Special Master time to address the issue); cf. *Wyoming* v. *Oklahoma*, 502 U.S. 437, 463 (1992) (Scalia, J. dissenting) ("Almost all other litigants must go through at least two other courts before their case receives our attention. It has become our practice in original-jurisdiction cases to require preliminary proceedings before a special master, to evaluate the facts and sharpen the issues.").

United States by Citizens of another State." U.S. Const. Amend. XI. As the Master recognized, the Eleventh Amendment also prevents a State from suing as a "trustee" seeking to enforce the rights of individual citizens. See Rep. 85-98. See *New Hampshire* v. *Louisiana*, 108 U.S. 76 (1883); *North Dakota* v. *Minnesota*, 263 U.S. 365 (1923).

The Eleventh Amendment does not bar, however, a suit brought by a State acting as parens patriae "to prevent or repair harm to its 'quasi-sovereign' interests." *Hawaii* v. *Standard Oil Co.*, 405 U.S. 251, 258 (1972). As the Court stated in *North Dakota*:

> The right of a State as *parens patriae* to bring suit to protect the general comfort, health, or property rights of its inhabitants threatened by the proposed or continued action of another State, by prayer for injunction, is to be differentiated from its lost power as a sovereign to present and enforce individual claims of its citizens as their trustee against a sister State.

263 U.S. at 375-376; see also *Maryland* v. *Louisiana*, 451 U.S. 725, 745 n.21 (1981) ("[A]n original action between two States only violates the Eleventh Amendment if the plaintiff State is actually suing to recover for injuries to specific individuals."); *Hawaii*, 405 U.S. at 259 n.12 ("An action brought by one State against another violates the Eleventh Amendment if the plaintiff State is actually suing to recover for injuries to designated individuals.").

The *New Hampshire* and *North Dakota* decisions illustrate that distinction. In *New Hampshire*, citizens of New Hampshire and New York held bonds issued by the State of Louisiana, payment of which was in default. The individual holders assigned the

bonds to their respective States, which brought an original action in this Court to recover the amount due on the bonds. The Court concluded that the States' action was barred by the Eleventh Amendment because it was a mere subterfuge for recovery on behalf of the individual bondholders. The States, according to the Court, were "nothing more nor less than * * * mere collecting agent[s] of the owners of the bonds and coupons, and while the suits are in the names of the states, they are under the actual control of individual citizens, and are prosecuted and carried on altogether by and for them." *New Hampshire*, 108 U.S. at 89.[4]

In *North Dakota*, the Court ruled that the Eleventh Amendment barred North Dakota from bringing a damages claim against Minnesota seeking $1 million "for its inhabitants whose farms were injured and whose crops were lost" as a result of flooding allegedly caused by Minnesota's use of the Mustinka River. 263 U.S. at 374. The Court observed:

[4] Among other things, the individual owners were required to fund all costs and expenses of the litigation, and state law required that all moneys collected be kept by the State's Attorney General, as special trustee, in a separate account. Those moneys were to be paid over to the owner of the bond after the litigation costs were deducted. *New Hampshire*, 108 U.S. at 89. In the case of New Hampshire, the individual bondholders also had the right to choose their own counsel to pursue the claim, and their consent was required before the claims could be settled. *Ibid.* Based on those facts, the Court declared that "[n]o one can look at the pleadings and testimony in these cases without being satisfied, beyond all doubt, that they were in legal effect commenced, and are now prosecuted, solely by the owners of the bonds and coupons." *Ibid.*

> The evidence discloses that nearly all the Dakota farm owners, whose crops, lands, and property were injured in these floods, contributed to a fund which has been used to aid the preparation and prosecution of this cause. It further appears that each contributor expects to share in the benefit of the decree for damages here sought, in proportion to the amount of his loss. Indeed it is inconceivable that North Dakota is prosecuting this damage feature of its suit without intending to pay over what it thus recovers to those entitled.

Id. at 375. The Court ruled that North Dakota was acting, not as parens patriae, but as a trustee, seeking to present and enforce individual claims of its citizens. *Ibid.*

In this case, the Master determined that Kansas had commenced the current action as parens patriae to protect its sovereign and quasi-sovereign interests under the Arkansas River Compact, and not as a trustee for individual Kansas citizens. See Rep. 88 ("Of course, this action is no mere contrivance by Kansas to obtain damages for its water users."). He concluded that Kansas is the real party in interest and is seeking recovery for injuries to its legitimate interests in the general economic well-being and property of its citizens, interests which are "independent of and behind the titles of its citizens." *Alfred L. Snapp & Son, Inc.* v. *Puerto Rico*, 458 U.S. 592, 604 (1982) (quoting *Georgia* v. *Tennessee Copper Co.*, 206 U.S. 230, 237 (1907)).

In light of this Court's decisions, the Master properly concluded that, so long as the end to be achieved is compensating a State for injury to its own legitimate interests, as distinguished from compen-

sating designated citizens for injuries to their individual rights, the Eleventh Amendment allows consideration of evidence of individual losses that is relevant in calculating the proper measure of the State's damages. The Master's recommendation is consistent with the Court's invocation of broad discretion in formulating a fair and equitable remedy in cases under the Court's original jurisdiction. See *Texas* v. *New Mexico*, 482 U.S. at 130 (the Constitution entrusts the Court with sufficient judicial power to "order[ ] a suitable remedy, whether in water or money," and "the Eleventh Amendment is no barrier, for by its terms, it applies only to suits by citizens against a State").[5]

[5] There is a passage in the Master's report that suggests a broader use of individual loss evidence. In addressing Kansas's claim that the Compact itself requires treating individual water users and the State as one, the Master stated that "the State of Kansas is the signatory to the Arkansas River Compact, and the only party that can sue to protect the Stateline flows guaranteed for use by Kansas water users. * * * If a money remedy is awarded for past compact violations, the damages should include all losses that have occurred as a result of such violations, including those suffered by individual water users, subject only to the overriding consideration that the remedy must finally be a 'fair and equitable solution.'" Rep. 103 (quoting *Texas* v. *New Mexico*, 482 U.S. 124, 134 (1987)). That passage, however, does not necessarily herald an Eleventh Amendment transgression. In any event, as we have noted, the Master's definition of the scope of Kansas's interests and his use of evidence of individual losses in calculating damages will be fully reviewable once he recommends a final remedy.

II. COLORADO'S CHALLENGE TO THE POSSIBLE AWARD OF PREJUDGMENT INTEREST IS NOT RIPE FOR CONCLUSIVE RESOLUTION BY THIS COURT

Colorado also takes issue (Br. 24-26) with the Master's recommendation that, if Kansas proves that it is entitled to compensation, either in the form of money damages or make-up water, the award may, depending on future evidence adduced at trial on the remedy issue, include prejudgment interest. See Rep. 113. According to Colorado (Br. 24), the Court is bound by the traditional common law rule that prejudgment interest is not allowed on unliquidated claims. Colorado's second exception, like its first, should be overruled because it does not present an issue that is ripe for resolution at this time.

A. This Court has never directly considered whether there is a categorical rule against prejudgment interest in original jurisdiction cases. The United States' liability for interest in original actions, like its liability in other cases, is governed by the usual principles respecting federal sovereign immunity.[6] The liability of the individual States, however, remains an open question. Colorado asks this Court to address the issue in an abstract and hypothetical context in which any award would be contingent on future proceedings before the Master. We suggest that the Court should decline that

[6] This Court has held that "in the absence of constitutional requirements, interest can be recovered against the United States only if express consent to such a recovery has been given by Congress." *United States* v. *New York Rayon Co.*, 329 U.S. 654, 658-659 (1947). See also *Library of Congress* v. *Shaw*, 478 U.S. 310 (1986).

invitation and overrule Colorado's exception without prejudice.

The question whether a State may obtain prejudgment interest in an original proceeding should be resolved in a concrete factual context. That context is missing in this case. The Master has made no decision whether prejudgment interest should be awarded to Kansas. Indeed, the Master has not yet determined what, if any, remedy would be appropriate and whether that remedy should take the form of replacement water or money damages. Rather, the Master has stated that "the possible award of prejudgment interest will depend upon the evidence presented in future trial proceedings." Rep. 114. Like its Eleventh Amendment challenge, Colorado's challenge to the use of prejudgment interest may become moot depending on how the Master resolves future evidentiary questions at trial. If the Master ultimately recommends an award of some measure of prejudgment interest, the issue will be fully reviewable by the Court at that time.

B. This Court should be reluctant to resolve Colorado's exception at this point in the absence of a strong showing that the Master's preliminary recommendation is misguided. Colorado has not made such a showing. To the contrary, the Master has identified a number of considerations that provide a sensible basis, at least in the context of an award of money damages, for rejecting Colorado's contention that this Court should adopt a categorical rule prohibiting prejudgment interest. See Rep. 105-111.

First, although the Court has acknowledged the traditional common law approach to prejudgment interest, see, *e.g.*, *Monessen Southwestern Ry.* v. *Morgan*, 486 U.S. 330, 338-339 (1988) (concluding that

Congress intended to incorporate the common law rule against prejudgment interest into the Federal Employers' Liability Act), the Court has repeatedly noted that the distinction between liquidated and unliquidated damages is questionable and that the rule against prejudgment interest is inconsistent with the goal of full compensation. See *City of Milwaukee* v. *Cement Div., Nat'l Gypsum Co.*, 515 U.S. 189, 197 (1995) ("[T]he liquidated/unliquidated distinction has faced trenchant criticism for a number of years."); *Funkhouser* v. *J.B. Preston Co.*, 290 U.S. 163, 168-169 (1933) ("It has been recognized that a distinction, in this respect, simply as between cases of liquidated and unliquidated damages, is not a sound one. Whether the case is of the one class or the other, the injured party has suffered a loss which may be regarded as not fully compensated if he is confined to the amount found to be recoverable as of the time of the breach and nothing is added for the delay in obtaining the award of damages.").

Second, the rule against prejudgment interest for unliquidated claims has not been as absolute as Colorado portrays. For example, prejudgment interest has been allowed in instances of "bad faith or other exceptional circumstances." *General Motors Corp.* v. *Devex Corp.*, 461 U.S. 648, 653 (1983) (noting that under the common law rule, "prejudgment interest could not be awarded where damages were unliquidated, absent bad faith or other exceptional circumstances"). Moreover, the courts have not always felt bound even by that construction of the rule. As this Court noted in *Funkhouser*, because the common law rule provided inadequate compensation, "the rule with respect to unliquidated damages has been in evolution, and in the absence of legislation the courts have

dealt with the question of allowing interest according to their conception of the demands of justice and practicality." 290 U.S. at 168-169 (citation omitted).[7]

Third, this Court has never addressed the issue of prejudgment interest in the context of interstate original actions. While the Court is certainly free to adopt the common law rule here, the nature of this Court's original jurisdiction and its broad discretion in formulating fair and equitable remedies in such cases, see *Texas* v. *New Mexico*, 482 U.S. at 130, may provide a basis for the Court to modify or reject a common law rule developed in other contexts. For example, in *Texas* v. *New Mexico*, the Court rejected New Mexico's contention that it was precluded from awarding post-judgment interest in the absence of any statute authorizing such interest. *Id.* at 133 n.8.[8]

In sum, the Master has provided a sound basis for rejecting Colorado's categorical rule at this interme-

[7] Furthermore, the courts have recognized an established exception to the rule against prejudgment interest for suits in admiralty, where the rule was that prejudgment interest was recoverable except in "peculiar" or "exceptional" circumstances. See *City of Milwaukee*, 515 U.S. at 194 (collecting cases). A similar exception existed for parties owing debts to the Federal Government, including debts owed by state and local governments. See, *e.g.*, *United States* v. *Texas*, 507 U.S. 529, 533-534 (1993); *Board of Comm'rs* v. *United States*, 308 U.S. 343, 350-353 (1939).

[8] New Mexico had relied in part on the Court's opinion in *Pierce* v. *United States*, 255 U.S. 398, 406 (1921), which, after noting the common law rule that judgments do not bear interest, held that post-judgment interest may not be awarded in the absence of statutory authority. Emphasizing its broad discretion in original jurisdiction cases, the Court declared that "we are not bound by this rule in exercising our original jurisdiction." *New Mexico*, 482 U.S. at 133 n. 8.

diate stage of the remedial proceedings. We submit that the ultimate merits of those arguments are best evaluated in the context of the Master's recommendation of a final remedy. We accordingly urge the Court to overrule Colorado's exception on the ground that it is not yet ripe for this Court's conclusive resolution.

CONCLUSION

The exceptions of Colorado to the second report of the Special Master should be overruled without prejudice to Colorado's right to renew those exceptions, if necessary, at the conclusion of the Master's remedial proceedings.

Respectfully submitted.

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SUPREME COURT, U.S.

No. 105, ORIGINAL

In The

Supreme Court of the United States

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

and

UNITED STATES OF AMERICA,

Defendant-Intervenor.

ARTHUR L. LITTLEWORTH, Special Master
THIRD REPORT

August 2000

COCKLE LAW BRIEF PRINTING CO., (800) 225-6964
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ABBREVIATIONS AND GLOSSARY

1.	Reporter's Transcript	RT Vol. ___ at ___
2.	Exhibits of Parties, and Joint Exhibits	Kan. Exh. ___ Colo. Exh. ___ U.S. Exh. ___ Jt. Exh. ___
3.	Post-Remedy Phase Briefs	
	(a) Kansas' Post-Trial Brief on Colorado's Repayment for Compact Violations 1950-1994	Kan. Post-Trial Br.
	(b) Colorado's Closing Brief on a Remedy for Past Depletions	Colo. Closing Br.
	(c) Kansas' Reply to Colorado's Closing Brief on a Remedy for Past Violations	Kan. Reply Br.
	(d) Colorado's Reply Brief	Colo. Reply Br.
4.	Acre-foot	AF, a volume of water one foot deep over one acre in area; equal to 325,900 gallons.
5.	Cubic feet per second	cfs, a rate of flow equal to 7.48 gallons per second, or 1.983 acre-feet per day.
6.	Evapotranspiration	ET, loss of water from soil by evaporation and by transpiration from plants growing thereon.
7.	Gallons per minute	gpm

KANSAS v. COLORADO THIRD REPORT

SECTION I

INTRODUCTION

This Third Report essentially completes the remedy phase of the trial for past violations of the Arkansas River Compact. Evidence was presented on injury to Kansas for the period 1950-94. Some additional depletions of State-line usable flow continued until at least 1996, and so damage figures will have to be adjusted to the time of judgment. However, it is possible that the update can be accomplished by stipulation, or at least without lengthy additional proceedings.

The trial segment on the form and amount of Colorado repayment for compact violations began on November 8, 1999, and was concluded on January 28, 2000. There were 37 trial days during this segment of the trial (RT Vols. 178-214), with 33 appearances by 19 expert witnesses. A total of 306 exhibits were offered. Evidence on money damages was heard first. Only three days at the end of the trial were devoted to Colorado's proposal to repay past depletions in water. Closing briefs were filed March 16, 2000, and reply briefs on April 24, 2000. A draft copy of the Third Report was mailed to the states on June 30, 2000 requesting comments by July 28. Some changes were made in response to those comments.

The final Kansas damage claim for money repayment, as revised during the trial, was $62,369,173. Kan. Exh. 1092, Table D7. This figure is in 1998 dollars. Colorado reserved an Eleventh Amendment objection to any damages based upon injuries to individual water users in

Kansas (RT Vol. 178 at 25-27), but subject to that reservation, Colorado's evidence on Kansas' damages amounted to $4,742,070 in "nominal dollars," i.e., the actual dollar value when the damage occurred. Colorado indicated that this total would be $9,047,075 if adjusted for inflation to 1998, but without prejudgment interest. Colo. letter dated 3/2/2000. Colorado also proposed an alternate remedy of repayment in water instead of money. The Colorado water repayment program called for the historic shortage (approximately 428,000 acre-feet from 1950 to 1996) to be repaid over 15 years at an average rate of 30,000 acre-feet per year. Kansas opposed repayment in water.

Kansas also made an alternate damage offer of proof consisting of 16 exhibits (Kan. Exhs. 985-1000, with the exception of 987). RT Vol. 190 at 66-69. These exhibits included a quantification of the benefits to Colorado arising from the use of water to which Kansas was entitled. RT Vol. 190 at 66. In my Second Report (Section XIII, a copy of which is included as Exhibit 1 in the Appendix), I rejected the legal theory that damages should be based on gains in Colorado as opposed to injuries to Kansas. Prior to the commencement of this trial segment Colorado also filed a Motion in Limine to Exclude Evidence of Colorado's Benefits from Violations of the Arkansas River Compact. That motion was granted by my July 28, 1999 Order (a copy of which is included as Exhibit 2 in the Appendix), and on the basis of that Order, the offer of proof was refused. RT Vol. 190 at 67. In its comments on the draft Third Report, Kansas states that the offer of proof was made not to support an award of damages on

the basis of Colorado gains, but rather to show the fairness of the Kansas damage claim based upon its losses, including prejudgment interest. Under the offer of proof, Kansas' damages would have amounted to $321,990,546.

Kansas analyzed its damages in four separate categories of costs or losses resulting from depletions of usable Stateline flows. These were: (1) additional costs incurred from pumping groundwater to replace depletions of surface water deliveries; (2) increased costs to pump groundwater in a larger regional area, both in the past and in the future, due to water level declines attributable to depletions of usable Stateline flows; (3) crop production losses on lands in the ditch service areas that were irrigated by surface water only, and did not have wells to replace depletions of usable Stateline flows; and (4) secondary or indirect economic losses to the Kansas economy resulting from the increased costs of pumping and crop production losses. Colorado experts did not believe that secondary impacts to the Kansas economy could be established factually, but otherwise, Colorado accepted the Kansas approach to damages (subject to its Eleventh Amendment objection), and Colorado organized its response using the same categories. RT Vol. 193 at 70-72.

Kansas did not seek separate damages for the reduction of groundwater supplies that were permanently lost because of reduced groundwater recharge and increased pumping to offset depletions of usable Stateline flows. Kan. Exh. 892, Section A at 4.

SECTION II

RECENT PROCEDURAL HISTORY

The Supreme Court issued its first opinion in this case (514 U.S. 673, 131 L.Ed.2d 759, 115 S.Ct. 1733) on May 15, 1995, confirming my First Report and the fundamental finding that postcompact well pumping in Colorado had violated Article IV-D of the Arkansas River Compact. Article IV-D provides that upstream development in Colorado shall not cause material depletions of usable Stateline flows into Kansas. On remand, additional trial proceedings were held to quantify the shortage, and to assess Colorado's current compliance with its compact obligations. The states stipulated that depletions for the period 1950-85 were 328,505 acre-feet, and I later found that additional depletions for the period 1986-94 were 91,565 acre-feet.

My Second Report, filed in September 1997, sought approval of the shortages, recognition of Colorado's compliance efforts, and a ruling on several legal issues affecting the remedy phase of the trial. Exceptions were taken only by Colorado on two of the legal issues determined. Colorado excepted to my ruling that prejudgment interest is not barred because the Kansas claim is unliquidated, and that the Eleventh Amendment of the United States Constitution does not bar an award of money damages from being based, in part, on losses incurred by Kansas water users. Kansas and the United States opposed the Colorado exceptions. Rather than hearing and deciding the issues at that time, the Court overruled the exceptions without prejudice to Colorado's right to renew those exceptions at the conclusion of the remedy phase of the

trial. 522 U.S. 1073 (1998). Section XIV (Eleventh Amendment) and Section XV (Prejudgment Interest) of my Second Report are included as Exhibits 3 and 4, respectively, in the Appendix to this Third Report.

A status conference was held on March 6, 1998, in Denver. Among other matters, Colorado was ordered to provide Kansas by September 15, 1998 (later extended to November 1, 1998) a report describing how Colorado intended to acquire and deliver sufficient makeup water to offset Stateline depletions, if a water remedy should be ordered. And Kansas was ordered to provide to Colorado by November 16, 1998, its expert reports on money damages. Colorado delivered its own expert report on money damages to Kansas in August 1999. Thereafter, additional supplemental expert reports were exchanged. Throughout this period of time, depositions of the experts and others were taken upon schedules arranged by the states.

On May 11, 1998, the trial resumed to consider compact compliance for the 1995-96 period, and the modeling and other differences which then existed between the states. At the conclusion of this trial segment, I issued an order on January 11, 1999 deciding the modeling and other issues, and ordering the states to re-run the H-I model in accordance with those decisions for the purpose of determining depletions to usable Stateline flow for the years 1995-96. This was done, and the results were presented in the form of Joint Exhibit 183. In accordance with that exhibit, I found by Order dated July 28, 1999, that depletions for the 1995-96 period were 7935 acre-feet. This Order brings the total depletions of usable Stateline flows for 1950-1996 to 428,005 acre-feet. Copies of these

two orders are included as Exhibits 5 and 6, respectively, in the Appendix.

Additional trial proceedings will still be required to assess compact compliance for the period following 1996, and to determine the sufficiency of Colorado efforts to achieve full compliance.

As part of the recent remedy proceedings, Kansas objected to certain portions of a Colorado expert report (Colo. Exh. 1096) relating to mitigation of damages. The objection was sustained in a written Order dated March 22, 2000, a copy of which is included as Exhibit 7 in the Appendix.

During the remedy proceedings, Colorado objected to the admissibility of certain expert testimony regarding secondary economic damages to the Kansas economy. This objection was based upon the "gatekeeper" requirements of *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 125 L.Ed.2d 469, 113 S.Ct. 2786 (1993) and *Kumho Tire Co., Ltd. v. Carmichael*, 526 U.S. ___, 143 L.Ed.2d 238, 119 S.Ct. 1167 (1999). The objection was overruled in a written Order dated May 1, 2000, a copy of which is included as Exhibit 8 in the Appendix.

SECTION III

WATER USE IN KANSAS AND THE NOVEMBER 1998 STIPULATION

In Kansas, this case involves primarily the reach of the Arkansas River between the Stateline and Garden City, a distance of approximately 62 miles. This portion of the Arkansas River roughly parallels U.S. Highway 50 and passes through the towns of Coolidge, Syracuse, Kendall, Lakin, Deerfield, Holcomb, and Garden City. Kan. Exh. 471; RT Vol. 27 at 50. Originally, eight canal or "ditch" companies in Kansas diverted surface flows of the Arkansas River in this reach. Today the Alamo and Fort Aubrey ditches no longer operate, although the lands formerly irrigated by these ditches continue to be irrigated by wells. RT Vol. 28 at 15; RT Vol. 178 at 75. The ditch companies now operating between the Stateline and Garden City are, in downstream order, the Frontier, Amazon, Great Eastern, South Side, Farmers, and Garden City. Kan. Exh. 872 and 873. The Frontier ditch service area is in Hamilton County. The remaining ditch companies serve portions of Kearny and Finney Counties and overlie the Ogallala groundwater aquifer. RT Vol. 178 at 60. In 1950, it was estimated that 50,839 acres were irrigated by the eight canal companies. By 1994, the irrigated acreage had declined to approximately 44,000 acres. Stipulation, Table 4B, col. b. All of this land receives surface irrigation deliveries from the Arkansas River, and in addition, some lands receive supplemental water from wells. In 1950, the percentage of lands having supplemental well water available was 43.7 percent. By 1994 this percentage had increased to 80.2 percent. Stipulation, Table 4B, col. t.

To determine money damages, it was necessary to analyze the impacts in Kansas resulting from the annual depletions to usable Stateline flows. These depletions caused reductions in groundwater recharge from the Arkansas River, as well as reductions in diversions by the ditches in Kansas. RT Vol. 178 at 61-62, 92-94. In an effort to establish these hydrologic and engineering facts before trial, I ordered counsel for the states and their appropriate experts to confer. After some six months of investigation and negotiations, the states agreed to a Stipulation that was approved in November, 1998. This Stipulation is a significant achievement by the parties and has provided a common factual basis for experts for both states from which to estimate damages.

The Stipulation includes a two-page summary for all canals in the Kansas canal service areas for each year in the period 1950-94, followed by similar two-page tables for each of the eight Kansas canals, together with an annual listing of total acres irrigated and acres also irrigated by wells. The two-page summary for all canals (Table 4B) is included as Exhibit 9 in the Appendix. The procedure used by the states in formulating the Stipulation was first to determine the depletions to groundwater recharge directly from the Arkansas River in Kansas. RT Vol. 178 at 124, 127. The remaining depletions were then allocated to the ditches in Kansas on the basis of relative shortages in crop irrigation requirements. Depletions to farm headgate deliveries were estimated by deducting estimates of canal and lateral losses for each ditch (and in the case of the Great Eastern ditch, losses due to storage in Lake McKinney.) RT Vol. 178 at 62-63. The Stipulation covers the years 1950-94, and during that period Stateline

depletions of usable flow totaled 420,071 acre-feet. Stipulation, Table 4B, col. g.

These depletions resulted in lost groundwater recharge in the amount of 220,252 acre-feet. This is the total of all net reductions in groundwater recharge due to ditch losses, reservoir seepage, farm delivery (canal) losses, and river losses. Stipulation, Table 4B, cols. ah, ai, aj, and second col. from right. When additional pumping required to offset Stateline depletions is considered, the total loss of Kansas groundwater for the 1950-94 period is 324,866 acre-feet. *Id.* at cols. ac, ad, last col. page 2.

The Stipulation also calculates the amount of pumping that was required by farmers in the canal service areas in order to make up for depletions of usable Stateline flows. This figure is 154,526 acre-feet. *Id.* at col. u; RT Vol. 178 at 69; Kan. Exh. 892, Table A1. The Stipulation also determines the amounts of the depletions to farm headgate deliveries that were not replaced by well pumping. This amount is 72,036 acre-feet for the 1950-94 period. Stipulation, col. v; RT Vol. 178 at 128. This is the shortage to the "surface water only lands."

In addition to the Stipulation allocating depletions, Kansas used, and Colorado accepted, a groundwater model to determine water level declines in the regional area, beyond the ditch service areas, resulting from depletions of usable Stateline flow. RT Vol. 178 at 76-77, 94; Kan. Exh. 874. This model was adapted by Kansas expert Steven Larson from an earlier groundwater model developed by the U.S. Geological Survey. Kan. Exh. 874 at 5-8; RT Vol. 179 at 37-39.

SECTION IV

MONEY DAMAGE ISSUES

One commentator has said, there is a "special drama" when one state sues another invoking the original jurisdiction of the Supreme Court.[1] If so, that drama is surely heightened by the money damage issues in this case. Judgments requiring the payment of money between states are rare, and historically have involved only liquidated amounts. *South Dakota v. North Carolina*, 192 U.S. 286, 48 L.Ed. 448, 24 S.Ct. 269 (1904) (amount due on bonds); *Virginia v. West Virginia*, 220 U.S. 1, 55 L.Ed. 353, 31 S.Ct. 330 (1911), 238 U.S. 202, 59 L.Ed. 1272, 35 S.Ct. 795 (1915), 246 U.S. 565, 62 L.Ed. 883, 38 S.Ct. 400 (1918) (involving payment of a proportionate share of a known debt); *Maryland v. Louisiana*, 451 U.S. 725, 68 L.Ed.2d 576, 101 S.Ct. 2114 (1981), 452 U.S. 456, 69 L.Ed.2d 156, 101 S.Ct. 3075 (1981) (refund of taxes improperly collected). There is no precedent for the calculation of money damages for violation of an interstate water compact.

This Court ruled in *Texas v. New Mexico*, 482 U.S. 124, 96 L.Ed.2d 105, 107 S.Ct. 2279 (1987) that a suitable remedy for violation of the Pecos River Compact could be in water or money, but on remand the states stipulated to a money judgment. *Texas v. New Mexico*, 494 U.S. 111, 108 L.Ed.2d 98, 110 S.Ct. 1293 (1990). The issues were not tried. The Arkansas River Compact is similar to the Pecos Compact, and in my Second Report, I concluded that

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[1] Vincent L. McKusick, Chief Justice (Retired), Maine Supreme Judicial Court, Maine Law Review, Vol. 45, Number 2, 1993.

Texas v. New Mexico is controlling and that a remedy here may be in terms of money damages or in water. Second Report at 72. In this Third Report, in Section XII, I have concluded that repayment of the shortage by making additional water deliveries, as proposed by Colorado, is not appropriate, and that Kansas should be compensated for its losses by monetary damages.

A. Legal Issues.

Damages in this case depend upon several fundamental legal issues, as well as a multitude of factual questions. The legal issues include these questions:

1. Should the measure of damages be based upon the gains to Colorado farmers resulting from the use of Kansas' entitlement, or upon the injuries suffered by Kansas from the depletions of usable Stateline flow? I recommended in my Second Report that damages should be based on Kansas' loss rather than upon any gain by Colorado. That section of the Second Report is again included here as Exhibit 1 of the Appendix. The damage segment of the case was tried on the basis of this ruling, and accordingly I granted Colorado's motion in limine to exclude evidence of Colorado's benefits (Exhibit 2 herein), and refused an offer of proof by Kansas during the trial, rejecting 16 exhibits. RT Vol. 190 at 66-69. In its comments to the draft Third Report, however, Kansas states that it was not the purpose of the evidentiary offer to provide for an award based on Colorado gains. Rather, its purpose was to show that the Kansas damage claim based upon its losses, including prejudgment interest for

all years, represented "a fair and equitable solution." *Texas v. New Mexico*, 482 U.S. at 134.

2. Does the Eleventh Amendment of the United States Constitution preclude any damage recovery to Kansas based upon losses sustained by the farmers in Kansas? Again, in my Second Report this issue was considered at length, and I recommended in Section XIV thereof that the Court should reject the Colorado argument. A copy of that section is now included as Exhibit 3 of the Appendix in this Third Report. Colorado filed an Exception to this recommendation. The Exception was overruled, but without prejudice to renewal at the conclusion of the remedy phase.

The evidence received during this recent damage phase reinforces my original ruling. A large area of southwestern Kansas, almost 800,000 acres, has suffered from the compact violations, and will continue to be damaged for decades. Over the period 1950-94 the groundwater resources of the state were permanently damaged; 324,866 acre-feet of groundwater from the Ogallala aquifer have been lost because of the depletions of surface flows. Increased costs and lost farm income in the region have also caused secondary economic impacts throughout the state. A United States Geological Report stated: "Severe decreases in flow of the Arkansas River and declines in groundwater levels pose a serious threat to the economy of southwestern Kansas." Jt. Exh. 126. I note also that while Colorado maintains that the Eleventh Amendment precludes damages based on losses to farmers, it sought in these remedy proceedings to require the Kansas farmers to drill wells in order to mitigate the

shortage of surface flows caused by Colorado. This Colorado position runs contrary to its Eleventh Amendment argument.

Subject to Colorado's right to raise the Eleventh Amendment issues as an Exception to this Third Report, the damage phase was tried using regional increases in farm costs and reduced crop yields as a measurement, in part, of Kansas' damages.

3. Can prejudgment interest be awarded, as a matter of law, on an unliquidated claim? And, if so, should prejudgment interest be included as part of Kansas' damages based upon the law and facts in this case? Colorado's initial argument that prejudgment interest may not be included on an unliquidated claim was rejected in Section XV of my Second Report, and a copy of that section is included as Exhibit 4 of the Appendix. Colorado's Exception was overruled, but with a right to renew. During the trial segment on damages, Kansas' evidence on prejudgment interest was admitted, and my analysis of the prejudgment issues, and my recommendation, appear in Section XI of this Third Report.

4. Was Kansas obligated to mitigate its damages by drilling wells? My ruling on this issue, namely, that Kansas farmers were not so obligated, is included as Exhibit 7 of the Appendix.

5. Should expert testimony by Kansas' experts on secondary economic damages have been barred by the "gatekeeper" requirements of *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 125 L.Ed.2d 469, 113 S.Ct. 2786 (1993)? My opinion overruling that Colorado objection is found in Exhibit 8 of the Appendix.

B. Factual Issues.

The factual issues, of which there were many, arose in the context of the data relied upon by the various experts in forming their damage opinions. Actually, the factual disputes could have been far more numerous had it not been for the good cooperation between the states, and the fact that Kansas has one of the largest farm record systems in the United States. RT Vol. 189 at 85-86. Colorado's counsel, in his opening statement, explained that one of the reasons for originally proposing a water remedy was Colorado's concern over whether enough data would be available, particularly in the early years, from which to estimate damages. RT Vol. 211 at 47. However, he went on to say, "I, at least, have been somewhat amazed" at how much data the economists have been able to find in regard to well pumping costs. *Id.* While he still acknowledged disagreements between the states, he viewed them as "more a matter of degree at this point rather than magnitude." *Id.*

Each state had an economist as its lead expert. For Kansas, it was Professor Norman K. Whittlesey.[2] For

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[2] Professor Whittlesey retired three years ago after serving more than 20 years as a full professor and agricultural economist at Washington State University. Last year he was honored as a Fellow of the American Agricultural Economics Association. His publications, including books, refereed journal articles, technical bulletins, published papers, conference papers, and popular periodicals, take up some 14 pages of his qualifications. Kan. Exh. 891. Many of these publications bear directly on the issues in this case, including the value of water. He testified as an expert witness for the State of New Mexico in the interstate water case involving the Pecos River and the State

Colorado, it was Professor Dennis Wichelns.[3] The basic expert report on Kansas' damages is Kan. Exh. 892, which covers the period from 1950 to 1994. This report, of which Professor Whittlesey is the lead author, was provided to Colorado pursuant to a pretrial order in November 1998, about a year before the damage phase of the trial began. Colorado's report on a water remedy was exchanged at the same time, and its money damage report was delivered to Kansas in August 1999. The basic Colorado report on money damages is Colo. Exh. 1096, of which Professor Wichelns is the sole author. The Colorado report follows the same organizational format as Kansas' report, and so year by year comparisons of data used and results can be readily made. The states exchanged rebuttal reports prior to trial.

In preparing his initial report, Kan. Exh. 892, Professor Whittlesey relied upon local, regional and some national level data. His effort was to estimate average conditions throughout the ditch service areas and surrounding region which affected agricultural costs, crop

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of Texas. He has done consulting work for the State of Idaho (Snake River), Bonneville Power Administration, Natural Resources Defense Council, U.S. Corps of Engineers, EPA, General Accounting Office (water value) and the Office of Technical Assessment of U.S. Congress (water value in irrigation).

[3] Professor Wichelns' qualifications appear in Colo. Exh. 1095. He is an Associate Professor, Department of Resource Economics, University of Rhode Island, and has held that position since 1992. The listing of his publications also requires many pages. His research and consulting work have specialized in agricultural production and irrigation, and in water economics.

yields and income. Data was collected or estimated on an annual basis beginning in 1950. The underlying hydrologic conditions (water diversions, depletions, well production, etc.) were settled by the 1998 Stipulation. The use of "average" annual data is appropriate, and is the only practical way to assess the regional impacts of the surface water depletions. Colorado used the same approach. Professor Whittlesey's first calculation of damages, as delivered to Colorado in 1998, was 77.67 million dollars. Kan. Exh. 892, Section D, Table D6 at 28.

With the Kansas accumulation of data and analyses in hand, Professor Wichelns undertook his own investigation. He concentrated first on Kansas sources to obtain as much local data as possible: from Kansas State University, Kansas Farm Facts, Kansas Statistical Abstracts, Kansas Board of Agriculture, and the Kansas Farm Management Association. As a result of this work, the preparation of Professor Wichelns' report and subsequent expert depositions, Kansas acknowledged that significant reductions in its damage claim should be made. In its opening statement, counsel for Kansas stated the damages being sought were $64 million, as opposed to the earlier calculations which placed damages at nearly $78 million. RT Vol. 178 at 14. Because of the compound interest factor, relatively small changes in the underlying data (for example, in the price of natural gas used to fuel pumps) can have significant impacts on the damage claim. It is a tribute to the professionalism of the experts on both sides that during the course of the trial, further revisions continued to be made as better data or analyses emerged. The final Kansas figures are found in Kan. Exh. 1092; the final Colorado data tables in Colo. Exhs. 1265A and B.

SECTION V

ADDITIONAL PUMPING COSTS REQUIRED TO REPLACE DEPLETIONS OF USABLE STATELINE FLOW

The first component of Kansas' damages relates to the additional costs of pumping groundwater required to replace depletions of usable flow from the Arkansas River. This category of damage was confined to the lands within the ditch service areas. The amount of additional pumping required, i.e., 154,526 acre-feet, was agreed upon as part of the 1998 Stipulation. The total was then allocated among the canal companies annually for the 1950-94 period of time. Many of the farmers had wells to supplement their surface water supplies, and as to those lands, the Kansas experts assumed that the wells would have been used to replace the surface water depletions. Professor Whittlesey suggests that it would not always be true that the well capacity of each farm was sufficient to replace depletions of surface flow. Kan. Exh. 892, Section A at 4. Nonetheless, it was conservatively assumed that all depletions would be made up by pumping, and hence, crop yield and gross income would not suffer. *Id.* at 4-5. Only increased costs were considered, with the consequent impact on net farm income.

Colorado agreed with the "basic approach used by the Kansas experts to estimate the increased pumping cost." Colo. Closing Br. at 21; RT Vol. 193 at 70-71, RT Vol. 194 at 66-67, 151-52.

A. Methodology and Factual Agreements.

Well pumping costs consist of capital costs, and variable costs such as repairs, fuel, maintenance and operation labor. The general procedure followed by the Kansas experts was first to estimate the capital investment costs for irrigation wells, pumps and motors. Kan. Exh. 892, Section A at 6. These costs have now been agreed upon by the states for the period 1950-90, although some differences still remain for the years 1991-98. RT Vol. 210 at 9; Colo. Exhs. 1232*, 1245A; Kan. Exh. 1001, Table A2. Investment costs were then depreciated in a straight line. Kansas originally used 20 years for irrigation wells, and 10 years for pumps and motors, in order to determine the annual cost of depreciation. Kan. Exh. 892, Section A at 9-10. Prior to trial, in its rebuttal report and in response to Colorado criticisms, Professor Whittlesey lengthened the depreciation period for wells to 25 years, and for pumps and power units to 15 years. Kan. Exh. 1001 at 2. He also assumed an annual use level of 2500 hours. *Id.*, Kan. Exh. 892, Section A at 18.

Professor Wichelns, the Colorado expert, also made adjustments to his report. Earlier he had taken the position that the useful life of an irrigation well in Kansas did not vary with the number of hours pumped, and he rejected the inclusion of any depreciation and interest charge in well investment costs. Colo. Exh. 1096 at 13. In his surrebuttal testimony, however, Professor Wichelns agreed that it was not unreasonable to assume that wells do wear out partly due to use, as well as to age, and he applied 50% of the depreciation and interest charges on well investment in order to determine the additional costs of pumping. RT Vol. 210 at 24-25. He also accepted

Kansas' annual interest costs which were based on interest rates for new real estate loans in agriculture. Kan. Exh. 892 at 6, 10, Table A4; Colo. Exh. 1245C.

Once annual costs of depreciation and interest were determined, Kansas divided them by the average annual hours of use over the life of the investment in order to estimate an average annual cost per hour. Kan. Exh. 892 at 6. Estimates of well pumping capacities were used to determine the number of additional hours of pumping required to replace depletions, and hence, the added fixed costs imposed by the depletions. *Id.* These fixed costs were then combined with estimated variable costs of pumping in order to estimate the total cost per hour to pump groundwater in each of the ditch service areas. *Id.* at 6, 20. Since the Stipulation established the amount of additional groundwater pumping required each year during 1950-94 to replace depletions, the cost of such pumping could be determined by dividing the volume of groundwater pumped to replace depletions by the flow rate of the wells to determine the hours of additional use. These added hours of use in each ditch service area were then multiplied by the estimated average hourly cost of pumping for each year. *Id.* at 20.

Finally, Kansas adjusted the annual cost to pump additional groundwater for estimated federal and state income tax payments, and then compounded such annual costs to include interest through 1998. *Id.* at 21. The final results of the Kansas procedure are presented in Kan. Exh. 1092, Table A18.

B. Investment Costs.

By the conclusion of the evidentiary proceedings, the states had agreed upon the original investment costs for wells, pumps and motors for the period 1950-90. RT Vol. 210 at 9.[4] However, while the differences among experts had been narrowed, there still remained these issues: (1) investment costs for the period 1991-98; (2) whether the full costs of wells should be depreciated, or only one-half thereof; and (3) whether electric motors should be depreciated over 15 or 25 years.

With respect to well investment costs for the period 1950-90, the Kansas experts originally used estimates provided by A.A. Rauhut, the former sales manager of Henkle Drilling and Supply Company in Garden City, Kansas. Kan. Exh. 892, Section A at 8. Later, records produced at deposition showed some significant differences between actual costs and Mr. Rauhut's estimates. Colo. Exh. 1108 at 10-13; RT Vol. 194 at 68-86. In response, Kansas had Spronk Water Engineers compile cost data from the actual Henkle records, and these data were included in the October, 1999 Supplement to Kansas' original expert report. Kan. Exh. 1001, Table A2. The revised well investment costs were accepted by Colorado. RT Vol. 210 at 9.

Professor Whittlesey understood initially that the Henkle data extended only through 1990. RT Vol. 179 at 161; RT Vol. 204 at 61.[5] Therefore, for the period 1991-98,

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[4] Revisions were made to the expert reports of both states.

[5] This was incorrect. Henkle did have later records.

Kansas used data from Kansas State University, Department of Agricultural Economics. *Id.* These investment costs had been collected through a survey of well drillers and well development companies in western Kansas for the purpose of establishing appraisal values. RT Vol. 179 at 161; RT Vol. 204 at 53-54, 71. Professor Wichelns, however, believed that the Kansas State University data did not "coincide well" with the Henkle data for 1986-90. RT Vol. 210 at 9. Accordingly, he adopted a different approach for 1991-98. He took the 1986-90 values from Henkle and adjusted them, using "price indices for irrigation equipment" that were taken from the Kansas Cooperative Extension Service. RT Vol. 210 at 9-10.

Colorado argues that the Kansas State University values were "substantially" higher than the Henkle costs for the years when they overlapped, and that Kansas should have continued to rely on the Henkle data. Colo. Closing Br. at 25. Professor Whittlesey recognized that the KSU data were somewhat higher, and so he averaged the 1988-98 costs and used that result for the next three years (1996, 1997 and 1998). Kan. Exh. 1001 at 2, RT Vol. 204 at 64-65. He believed that this was a "conservative" approach. RT Vol. 204 at 54-55. In any event, the overlap with Henkle 1986-90 data was brief, and any comparison was much dependent upon the well depths selected. Colorado maintains that Professor Whittlesey could have obtained additional Henkle data for the period after 1990, but did not do so. Of course, Colorado did not do so either. Instead, Professor Wichelns relied upon a price index for irrigation equipment to adjust the 1986-90 Henkle costs. RT Vol. 210 at 9-10. There was no evidence to support the view that an equipment index was an

appropriate method of estimating construction costs of a well.

With respect to depreciation, Colorado expert James Slattery testified that the average age of wells within the ditch service area was approximately 34 years (in contrast to 20 years, revised to 25, used by Kansas). Colo. Exh. 1076 at 2, RT Vol. 191 at 27. Moreover, it was Professor Wichelns' initial view that the useful life of an irrigation well did not vary with the number of hours pumped. Colo. Exh. 1096 at 13. Hence, he concluded that it was not appropriate to include depreciation or an interest charge on well investment costs. *Id*. The average age of 34 years was computed by Mr. Slattery from a well database developed by the Kansas Division of Water Resources. Colo. Exh. 1076 at 2. It became clear, however, that this database did not record all re-drills of wells. It showed only the last year "if replaced more than once." Hence, in the Colorado averaging process, one well was assumed to be 85 years old, and more than 30 wells exceeded 60 years. Kan. Exh. 1043. Dale Book, a principal Kansas expert during the liability phase of the trial, properly concluded that the database did not include complete information from which the useful life of wells could be determined, and he did not use that evidence. RT Vol. 209 at 27-28. Based upon references in the literature, testimony in the 1990 phase of the trial, and more recent consultations with local well experts, Book testified to a useful life of 25 years, and Professor Whittlesey extended his depreciation period on wells from 20 to 25 years. RT Vol. 209 at 28-29; RT Vol. 202 at 103-104. This is also the well life that Professor Wichelns used in his original

report for Colorado. RT Vol. 202 at 77-78; RT Vol. 210 at 12.

Professor Wichelns, in his surrebuttal testimony, modified his position that wells wear out only with age, and not by use. RT Vol. 210 at 24-25. As a "compromise" with Kansas, he allocated 50% of the depreciation and investment charge to irrigation wells. *Id*. at 24. There was ample evidence, however, to support the consistent Kansas view that wells do depreciate with use. RT Vol. 202 at 78, 101-03; RT Vol. 209 at 28-29; Kan. Exh. 1002 at 1-3. Pumping affects the water table, and can cause problems of cascading water and air, sanding, plugging of filters, and casing deterioration. All of these impact the useful life of a well, and when it may have to be re-drilled. RT Vol. 209 at 28-29.

Professor Whittlesey depreciated electric motors over 15 years, although he acknowledged that there was some general literature support for using 25 years. In this case, however, after consulting with local people in the well business concerning the type of electric motors actually being used, and considering the fact that electric wells were being replaced rapidly as natural gas became available, he concluded that 15 years was an appropriate life to use in this case. RT Vol. 204 at 76-77. This was a reasonable approach.

C. Variable Costs of Pumping.

In addition to capital or fixed costs, the variable costs of increased groundwater pumping must be considered. These are costs for repairs, fuel (electricity or natural

gas), power unit maintenance, well operation labor, gear oil, engine oil, and drip oil. Gear oil is used to lubricate the gear box in gas engine systems. Engine oil is used in natural gas engines. Drip oil is used for lubricating the column that drives the turbine. These minor costs of lubrication were adjusted downward by Kansas to accept the values used by Colorado. Kan. Exh. 1001, Table A9; Colo. Exh. 1096, Table CO-A9. Thus, the states are now in agreement on these lubrication costs. However, the more significant costs of repairs, fuel and labor remain in dispute.

1. *Repair Costs.*

Kansas experts originally estimated repair costs from records of the Garden City Company which included total well expenses for the years 1971 through 1996. Kan. Exh. 892, Section A at 10-12; Table A5. These were records on 67 to 88 wells, depending upon the particular year examined. *Id.* Professor Whittlesey's procedure was first to remove the annual variation in these repair costs, and to extend the data over the entire 1950-96 period since there were no records for the period 1950-70. Kan. Exh. 892, Section A at 11; RT Vol. 204 at 81. This was accomplished using a well cost index constructed from the average total cost of well investment, normalized in 1998. Kan. Exh. 892, Section A at 11, Table A5, col. e. The index transformed annual repair costs per hour to a 1998 value. These costs were then averaged for the 1971-96 period, and the average value ($1.38 per hour) was extended back in time to 1950 using the well cost index. *Id.* at 11, Table A5. The result of this procedure was to produce

annual repair costs per hour for groundwater pumping in the ditch service area.

However, as Professor Wichelns pointed out in his report for Colorado, these "total well expense" data included expenditures in addition to repairs. Colo. Exh. 1096 at 20. Although the Kansas experts had not understood this when undertaking their original investigation, they acknowledged during the trial that these data did include costs for lubrication, power unit maintenance, and well operation labor. RT Vol. 185 at 16-17. These items had been separately estimated by Kansas as additional variable costs, and so they had to be removed from the repair computations in order to eliminate double counting. RT Vol. 204 at 117. The modified repair costs are now shown in Kan. Exh. 1074, col. (b). Average per-hour repair costs in 1950 show a reduction from 24 to 17 cents, and in 1998 from $1.34 to 79 cents. Lubrication and labor costs are shown separately in Kan. Exh. 1092, Table A9.

Colorado, on the other hand, relied upon three studies of irrigation pumping costs for the early years, and after 1982 upon detailed records maintained by the Garden City Company for each of its wells and engines. The results of its work appear in Colo. Exh. 1096, Table CO-A5. From the three studies, Professor Wichelns had repair values for 1950, 1961 and 1966, and then in 1982 from the Garden City Company records. Colo. Exhs. 1114, 1115, 1201. Intervening annual values were calculated by interpolation among these data points. RT Vol. 195 at 55-56. From 1982 forward, the Garden City Company data were used. *Id.* at 56. A side-by-side comparison of Kansas and Colorado repair costs appears in Kan. Exh. 1074, col. (b).

Neither state is exempt from valid criticism about the accuracy of its results – which may not be surprising considering the historic time period involved. The final revisions to the Kansas data were not made until after both Kansas and Colorado had completed their cases in chief. Kan. Exh. 1074 cf. to Kan. Exh. 1001; RT Vol. 204 at 102-03. Even then, Kansas did not take advantage of specific repair records that had become known during depositions. Colo. Exh. 1113 at 21-24, Deposition Exh. 9. Rather, Professor Whittlesey used an oblique approach, calculating repairs as the residual of certain expenses. This approach involved using the IEES model to calculate lubrication and certain labor expenses, and then deducting those costs from the Garden City Company's "total well expenses" to get repair costs. RT Vol. 204 at 117. These costs were then extended over the 1950-70 period using the well cost index. One of the problems with this use of the well cost index is the assumption that repair costs are roughly proportional over time to total well investment costs. However, by 1971, all but one of the Garden City Company wells were powered by natural gas engines, whereas in 1950 almost half had electric motors. Kan. Exh. 892, Table A7; RT Vol. 204 at 91-92, 96-97. And there was substantial evidence indicating that repair costs for electric motors were much less than repair expenses for natural gas engines. Kan. Exh. 1065 at 15; RT Vol. 204 at 84, 87; Colo. Exh. 1115 at 51-52.

Looking to the Colorado repair costs, Professor Whittlesey in his rebuttal testimony pointed to certain deficiencies in the three studies on which Colorado relied for values during the 1950s and 1960s. RT Vol. 202 at 105-117. The 1950 data point does appear weak. However, there

are strong data in the Sirohi and Trayer Studies which Professor Whittlesey did not appear to consider. Colo. Exhs. 1114, 1201. On rebuttal, Professor Whittlesey essentially recognized these anchor points. RT Vol. 203 at 13-14; Kan. Exh. 1074. The Trayer thesis was based on a survey of 75 Kansas Farm Management Association members in southwest Kansas in 1966. Colo. Exh. 1201 at 26-27. The survey included 158 irrigation wells, most of which were powered by natural gas. *Id.* at 38. It is true that some responses were given in round numbers, indicating less than complete accuracy. But despite Kansas' doubts, the repair cost estimate from this study (20 cents per hour) was not much less than the final revised estimate of the Kansas experts (24 cents per hour).

For the year 1982 and forward, Colorado used individual well record sheets produced by the Garden City Company on deposition. Colo. Exh. 1113, Deposition Exh. 9 and 26. The general manager of the company testified that these records showed "all costs for repairs." *Id.* 21-24. These sheets described each item of repair work done, the date, and the cost. It is true, as Professor Whittlesey pointed out, that some work seemed to include capital items rather than mere repairs. But that only increased the "repair" costs, to the advantage of Kansas. It is also true that some sheets show repair work done without a cost, or without accounting for shop labor. The vast majority of the sheets, however, are extremely detailed and complete.

The Colorado approach is more straightforward, and while the early data are sketchy, I find that the weight of the evidence supports the use of Colorado's repair costs.

2. *Electricity Costs.*

Rates paid for electricity to pump groundwater originally represented a significant cost difference between the states. Kan. Exh. 892, Table A8; Colo. Exh. 1096, Table CO-A8. The Kansas experts at first used electricity prices obtained from Rodger Funk, a farmer in the ditch service area who is a member of the Kansas Farm Management Association, and who maintained detailed records of his farm expenses. RT Vol. 182 at 49. Kansas had attempted to obtain records from the local power company, Wheatland Electric Cooperative, Inc., but had been told that such records did not exist. RT Vol. 182 at 51.

As the experts found out later, the Funk records were for tailwater pumping, not for irrigation wells. Tailwater pumps have shallow lifts and use a relatively small amount of electricity. Since Wheatland employed a declining block rate system of pricing, i.e., the greater the use, the lower the rate, the Funk rates for tailwater pumping were high. They substantially over-estimated the electricity costs for irrigation pumping generally. RT Vol. 194 at 153-54. It was also learned that the Wheatland Electric Cooperative had actually filed reports with the Kansas Corporation Commission showing all of its rates, including irrigation rates, from 1949. RT Vol. 182 at 52. These data from the Kansas Corporation Commission were supplied by Kansas to Colorado in April, 1999, and were used by Professor Wichelns in his report. Colo. Exhs. 1133, 1134; RT Vol. 194 at 154-55. Kansas subsequently revised its electricity rates in the October, 1999 Supplement to its primary report. Kan. Exh. 1001, Table A8.

There remain minor differences for electric rates in the expert reports for the two states, but the overall impact of the differences is not consequential. After the mid-1960s, virtually all wells were powered by natural gas engines, and electricity costs ceased to be a factor in assessing additional pumping costs. Kan. Exh. 1092, Table A7. Professor Wichelns in his report held electricity prices constant at one cent per kWh from 1950 to 1974. Colo. Exh. 1245E. The rates finally used by Kansas were sometimes slightly under, and sometimes slightly over, one cent per kWh. Kan. Exh. 1001, Table A8. The variation depends upon the differences between summer and winter irrigation rates, and on that basis the Kansas schedule should be used.

3. *Natural Gas Costs.*

Based upon the records of the Garden City Company, the numbers of natural gas and electric wells used in the ditch service areas were about equal in the early years. However, by the mid-1960s, virtually all irrigation wells had been converted to the use of natural gas engines. Kan. Exh. 892, Table A7. At first, the experts disagreed sharply over natural gas costs. Kan. Exh. 892, Table A8; Colo. Exh. 1096, Table CO-A8. However, the Kansas experts subsequently revised their gas costs downward, close to the rates used by Professor Wichelns for Colorado. Some small differences still remain. Kan. Exh. 1092, Table A8.

Professor Whittlesey initially had relied upon the natural gas prices paid by commercial customers. Kan. Exh. 892, Section A at 15. He stated in his report for

Kansas that while farmers had faced a range of natural gas prices over time, he thought that the rates used adequately represented "the average gas prices faced by study area farmers from 1950 to 1996." *Id*. However, Professor Wichelns, the Colorado expert, pointed out that these natural gas prices were substantially higher than those reported by farmers in their 1990 testimony during the liability phase of the trial. Colo. Exh. 1096 at 16-17; RT Vol. 33 at 28-30. One reason for lower prices in the trial testimony is the fact that southwest Kansas overlies a large gas field. Many farmers have natural gas wells in or near their farm fields, and can purchase gas at "wellhead" prices which are much lower than those charged to commercial customers for "pipeline" gas. Colo. Exh. 1096 at 16-17. Professor Wichelns, therefore, constructed an alternate series of natural gas prices based upon the earlier trial testimony of farmers, the records of the Garden City Company, and the records of Rodger Funk, taking into account the availability of wellhead gas. RT Vol. 195 at 19-46, Colo. Exhs. 1121, 1123A and B, 1124-26, 1128-30.

In response to Colorado's criticisms, Kansas undertook a further investigation of gas prices. The work was done by Dale Book, who has been involved in considerable data collection and analyses since commencement of the trial in 1990. He received and tabulated information on both wellhead and pipeline prices, and developed a weighted annual price series. RT Vol. 209 at 35. Pipeline rates came from filings with the Kansas Corporation Commission by the Kansas-Nebraska Company, the largest supplier in the area. *Id*. at 36. Prices paid for wellhead

gas vary from farm to farm depending upon lease conditions, and are not reported. A further complicating factor is the increase that has occurred in more recent years in the price of wellhead gas as production from some gas wells declined. Book, however, had some specific data points from the Garden City Company records, and from prior trial testimony by farmers. RT Vol. 209 at 36-40. He prepared a weighted prices series which represents the use of 65 percent wellhead gas and 35 percent pipeline gas. Kan. Exh. 1092, Table A8.

The apportionment between the use of wellhead and pipeline gas became the principal difference between the costs used by the respective experts. Book was aware that farmers in the 1950s and 1960s used both wellhead and pipeline gas, but there were no records evidencing the split between the two sources. RT Vol. 209 at 56-57. However, between 1981 and 1988 the records of the Garden City Company showed that pipeline gas comprised from 35 percent to 45 percent of the total gas used. RT Vol. 209 at 36, 51. Thereafter, according to David Brenn, manager of the Garden City Company, the ratio remained relatively constant at 60-40. *Id*. at 51. Brenn further stated that this ratio would be representative for other users in Finney County. *Id*. at 52. Mr. Book finally adopted a 65-35 percent ratio for the whole ditch service area, and extended that back in time over the earlier years. RT Vol. 209 at 56-57. Colorado suggests that the ratio of pipeline gas was less in the early years, but there is no good evidence to show that the ratio changed over time. Colorado cites the testimony of six farmers who testified earlier in the liability phase of the trial. They appear to have used only wellhead gas, but that is not to say that all

farmers had wellhead supplies available. Colo. Exh. 1121. I find that the weight of the evidence supports the conclusion reached by the Kansas expert.

Professor Wichelns, on the other hand, included no weighting for the use of pipeline gas during the first 20 years. RT Vol. 209 at 39-40. For all of the years after 1973, Professor Wichelns relied wholly on the records of Mr. Funk. RT Vol. 210 at 15-16. Apparently these records included the purchase of some pipeline gas, although it is not clear how much, and Mr. Book believed that it was less than 35 percent. RT Vol. 209 at 42. There are several problems in placing sole reliance upon the Funk records. First, the sample was very small. He had only 7 wells out of a total of 618 wells in the ditch service areas. RT Vol. 209 at 42; Colo. Exh. 1076, Table 2. Secondly, some of the prices in the Funk record were apparently off by a factor of ten. The decimal points were misplaced, seriously underestimating the prices. RT Vol. 209 at 60-64. Mr. Book examined the Funk records and found the discrepancies, and his previous work in this case in analyzing and tabulating complex sources of data leads me to rely upon his testimony. Finally, beginning in the early 1980s, wellhead gas was affected by substantially higher prices on "stripper wells," and this is not reflected in the Funk records. RT Vol. 209 at 37-38.

The weighted natural gas price developed by Mr. Book for 1990 corresponds closely to prices actually paid by farmers at that time, according to their earlier trial testimony. RT Vol. 209 at 42. Mr. Book's weighted price for that year was $2.35 per mcf, while in contrast the Funk records showed only $1.24. RT Vol. 209 at 43.

I find that the natural gas prices to be used should be those tabulated in Kan. Exh. 1092, Table A8. The 1998 price of $2.19 mcf is significant because that value is used to estimate future regional pumping costs. In that category of Kansas' damages, the price of natural gas is held stable at the 1998 level for the next 50 years. RT Vol. 209 at 70-72, Kan. Exh. 1014, Table 4.

4. *Pump Lifts Within The Ditch Service Areas.*

The "pump lift," as the term is used in this case, represents the number of feet required to raise groundwater to the surface of the ground. Pump lifts were calculated by Kansas as the average static groundwater level for each canal service area, at 5-year intervals, added to a constant drawdown caused by pumping. Such pump lifts were used in the calculation of the cost of additional pumping to replace reduced farm deliveries due to depletions. Kan. Exh. 1014 at 3. Colorado did not object to the static water levels used in the analysis, but recommended some modifications in the pumping drawdowns. Changes were made in the data used by both states, and Mr. Book and Mr. Slattery, Colorado's expert, came to agree upon the appropriate pump lifts to be used in the cost analysis. RT Vol. 191 at 43-44; RT Vol. 209 at 29-30; RT Vol. 210 at 14. The revised and agreed-upon data now appears in Kan. Exh. 1014, Table 2; Kan. Exh. 1092, Table A6; Colo. Exh. 1245D, Revised Table CO-A6.

5. *Agricultural Wage Rates.*

As part of the labor costs incurred by additional pumping, Kansas first relied upon average wage rate data published by the United States Department of Agriculture for the Great Plains States. Kan. Exh. 892, Section A at 19; RT Vol. 184 at 140-41. These data covered the period from 1950 to 1974. Beginning in 1971, Kansas had data available from the Kansas State University Extension Service. These data covered the period from 1971 to 1996, excluding the years 1972-73 and 1995. Kan. Exh. 892, Section A at 19. A comparison of the national data with the Kansas State University data for the two years when they overlapped, namely, 1971 and 1974, showed that the national data were approximately 30 percent lower. Accordingly, Kansas adjusted each of the national values for 1950-70, multiplying each by the scale factor 1.3. For the remaining years, 1973-94, the Kansas data appear to be quite gross, reported in even numbered dollars sustained for several years, with an occasional significant jump, e.g., $4.00 to $6.00 per hour wage. Wage rates used by Kansas in its analysis are found in Kan. Exh. 892, Table A9, and Kan. Exh. 1092, Table A9.

Colorado, on the other hand, relied upon data from annual reports known as the "Kansas Farm Facts," and upon Kansas Statistical Abstracts. RT Vol. 193 at 129-32. The Kansas Farm Facts were reports published annually from the 1930s by the Kansas State Board (since 1995 the Department) of Agriculture for the Kansas State Legislature. RT Vol. 193 at 101; Colo. Exhs. 1158-1165. Data in the Kansas Farm Facts reports were collected on a county-by-county basis, including Hamilton, Kearny and Finney

Counties, and included comprehensive statistics on acreage irrigated, crop yields, revenue, etc. RT Vol. 193 at 103. In some years, these reports also included a section on "Farm Labor and Wage Rates." RT Vol. 193 at 117. Professor Wichelns used these data for most years from 1950 to 1974. For the period 1975-94 he relied on the Statistical Abstracts published by another Kansas state agency. Colo. Exh. 1152; RT Vol. 193 at 131. As he noted, it was not necessary to use and adjust national statistics when specific local information was available. RT Vol. 193 at 118. I agree with Professor Wichelns, and find that the Colorado data on labor costs should be used in the damage analysis. When used in the pumping cost analysis, the lower Colorado labor costs decrease Kansas' damages. However, I see no reason why the same labor costs should not apply to Section VII on crop production losses. In that situation they will act to increase Kansas' damages.

D. Federal Income Taxes.

After estimating the annual costs to pump additional groundwater to replace depletions of usable surface diversions, the Kansas experts adjusted the costs to account for payment of federal income taxes. Kan. Exh. 892, Section A at 21. Professor Whittlesey reasoned that if well owners in the ditch service areas had not been required to incur additional costs to pump groundwater, they would have realized additional net farm income. However, this additional income would have been subject to both federal and state income taxes. *Id.* Kansas, therefore, reduced its damage claim by the amount of federal

income taxes that would have been paid, since they were not losses to the State of Kansas. State income taxes, however, were computed separately, since they were direct losses to Kansas on the additional net farm income that would have been realized, except for the surface water depletions.

Professor Wichelns, Colorado's expert, agreed that it was appropriate to adjust the estimates of annual pumping costs to account for federal and state income taxes. Colo. Exh. 1096 at 23. Moreover, the experts for both states agreed on the use of average "effective" marginal tax rates.[6] Kan. Exh. 892, Section A at 22-23. The specific tax rates to be used are discussed in Section IX of this Report.

E. Conclusions.

The additional costs of pumping groundwater to replace depletions of Arkansas River water are appropriate damages to be included in the Kansas claim. The methodology followed by the Kansas experts in estimating these costs is proper. These costs should be recalculated using the Kansas capital and variable costs, as revised (Kan. Exh. 1092), except for repair and agricultural wage rates. Colorado data should be used for these costs.

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[6] Professor Whittlesey reduced the marginal tax rates by 15% to account for the tax management opportunities available to farmers. Initially, Professor Wichelns did not agree, but later accepted this adjustment.

SECTION VI

REGIONAL GROUNDWATER DAMAGES

The second category of injury to Kansas results from a regional decline in groundwater levels. The states agreed in their November, 1998 Stipulation that the total loss of groundwater in the region for the period 1950-94 amounted to 324,866 acre-feet. Stipulation, Table 4B. This amount represents the loss of groundwater recharge from the Arkansas River, as well as from the increased pumping required to offset depletions of usable flow. The region affected comprises about 790,000 acres, in portions of Kearny and Finney Counties, which were studied by the U.S. Geological Survey in USGS Water Supply Paper 2253. Jt. Exh. 140; Kan. Exhs. 872, 873 and 874.

Kansas analyzed its damages resulting from the lower static groundwater levels throughout the region in terms of increased costs of pumping. Historic water level declines for the period 1950-94 are shown in Kan. Exh. 892, Table B1. Since these lower water levels will continue in the future, absent a water remedy, the Kansas experts also estimated future pumping costs for the next 50 years, from 1998 to 2048. Future additional pump lifts due to compact violations are shown in Kan. Exh. 892, Table B6.

In estimating these additional regional pumping costs, Kansas experts followed much the same procedures they used in the ditch service areas, discussed in Section V. However, they included only variable costs, and from these they also excluded repair costs. Kan. Exh. 892, Section B at 7. Capital investment costs and repair costs were not included in the damage analysis since they were considered to be functions of the amount of time a well is

used, rather than the depth from which water is pumped. RT Vol. 184 at 37-39. Professor Wichelns, for Colorado, agreed with the basic Kansas approach, although he disputed certain estimates of variable costs as discussed in Section V, and these differences also apply to regional pumping. Colo. Exh. 1096 at 38. Colorado, however, did not contest the revised pumping estimates used by Kansas, nor the changes in groundwater levels. RT Vol. 209 at 30-31; RT Vol. 191 at 43-44. In projecting future pumping, Kansas assumed that it would be equal to the average pumping for the period 1991-96, adjusted to climate conditions for the period 1950-96. RT Vol. 178 at 108-111. The Kansas analysis was based upon the assumption that there would be no further compact violations after 1994.[7] Kansas experts also made the conservative assumption that the declining groundwater levels would not reduce well efficiencies, nor affect the amount of time required to pump an acre-foot of water. RT Vol. 181 at 58.

As a result of its analysis, the Kansas experts concluded that additional regional pumping costs, imposed by lower groundwater levels for the historic period 1950-94, amounted to $4,515,590. Kan. Exh. 1092, Table B5. These damages included adjusting actual historic costs for the time value of money. Such an adjustment includes inflation and prejudgment interest, or in economic terms, "opportunity costs." As to additional future costs of pumping, Kansas experts estimated damages at

[7] This assumption, we know now, is not correct. Depletions for the period 1995-96 were determined to be 7935 acre-feet. Any additional depletions have yet to be considered.

$2,061,354. Kan. Exh. 1092, Table B8. This figure represents the present value of future costs, which were estimated to be $6,576,944 in 1998 dollars. A 3 percent discount rate was used to adjust the total future costs to present value. The purpose of discounting future damages to a present value is to allow a court to award damages as a lump sum, rather than ordering a defendant to pay damages in the future as they occur. *Jones & Laughlin Steel Corp. v. Pfeifer*, 462 U.S. 523, 536-37, 76 L.Ed.2d 768, 103 S.Ct. 2541.

Lower courts have observed that awarding prejudgment interest "is just the flip side of discounting" future losses to present value. *Matter of Oil Spill by the Amoco Cadiz*, 954 F.2d 1279, 1332 (7th Cir. 1992); *In re Air Crash Disaster Near Chicago, Ill. on May 25, 1979*, 644 F.2d 633 (7th Cir. 1981); *Moore-McCormack Lines, Inc. v. Richardson*, 295 F.2d 583 (2nd Cir. 1961). Colorado discounted, and thus reduced future regional damages, but did not add interest to past damages.

Colorado also estimated damages for additional pumping costs in the regional area. For future costs, Colorado experts estimated the present value of such additional costs at $1,323,719, using a 4 percent discount rate. Colo. Exh. 1245N. For higher regional pumping costs during the historical period of 1950-98, Colorado estimated the tax adjusted loss at $1,068,460, in what Colorado described as "nominal" dollars. Colo. Exh. 1245K. Colorado used the term "nominal" dollars to represent actual costs in the year incurred, without adjustment for inflation or prejudgment interest. Colorado then converted its nominal dollar estimates to constant 1998 dollars, using a consumer price index. The result of this

calculation for historic higher costs was $1,751,187. *Id.* This value did not include any interest. In Professor Barry's judgment, the Colorado procedure merely converted "past dollars into dollars today of comparable purchasing power," but did not account for the "opportunity costs" that farmers historically had. RT Vol. 208 at 33.

The disagreements among the experts stem from: (1) their differences over variable costs, the adjustments for federal and state income taxes, and whether a further adjustment should be included for lost social security benefits; and (2) whether such losses should include prejudgment interest, or merely be brought to 1998 values. These issues are all discussed elsewhere in this Report, and the recommendations made in such sections apply to higher regional pumping costs caused by depletions of usable flow. The data in Kan. Exh. 1092, Tables B1, B2, B3 and B6 should be used in the analysis. The loss due to higher pumping costs in the future, however, involves a separate dispute over the appropriate discount rate to be used in converting estimated future costs to a present value.

A. Discount Rate for Future Regional Damages.

In determining an appropriate interest rate, both for compounding past losses and discounting the additional future costs of pumping in the region, Professor Whittlesey consulted Professor Peter J. Barry at the University of Illinois. Professor Barry is preeminent in his field of

agricultural finance.[8] In 1998, Professor Whittlesey, in the preparation of his expert report, asked Professor Barry for the "most appropriate" interest rate to bring both past and future effects to a present value. RT Vol. 189 at 71-72, 74. In regard to discounting and compounding, Professor Barry testified that both were "part of the process of adjusting for the time value of money, either bringing values ahead to a value of present or bringing future values back to a present value." RT Vol. 208 at 26.

Kansas projected future additional pumping costs in constant 1998 dollars, that is, without any adjustment for inflation. Kan. Exh. 892, Section B at 7-8; RT Vol. 189 at 61. In "economic jargon," these costs are considered "real values." RT Vol. 181 at 65-66. Real values must be discounted using a "real rate" of interest, that is, a rate which does not include inflation. RT Vol. 181 at 61, 73; RT Vol. 208 at 27-32; Kan. Exhs. 1005, 1009, 1013. *O'Shea v. Riverway Towing Co.*, 677 F.2d 1194 (7th Cir. 1982). In this

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[8] His qualifications are contained in Kan. Exh. 973. He holds an endowed chair at the University of Illinois and has been a Professor of Agricultural Finance since 1979. He is a past editor of the American Journal of Agricultural Economics, a past president of the American Agricultural Economics Association, and current Chair of the Council on Food, Agricultural and Resource Economics. He is the recipient of numerous awards, the author or a contributing author of a number of books, and his qualifications list some 14 pages of publications, including many peer reviewed journal articles, book chapters, periodical articles, technical reports, and conference papers. The book "Financial Management in Agriculture," of which he is the principal author, is in its fifth edition and is a widely used undergraduate textbook in about 50 universities.

case, Kansas experts selected 3 percent as an appropriate discount rate. RT Vol. 189 at 61-62; Kan. Exh. 892, Table B8.

Professor Wichelns, in his expert report prepared for Colorado, first used a discount rate of 7.23 percent. Colo. Exh. 1096 at 41, Table CO-B8. During the trial, he acknowledged that this was a mistake. RT Vol. 195 at 119-20; RT Vol. 210 at 30-32. He misread the fact that Professor Whittlesey had estimated future pumping costs in real dollars, absent inflation, and hence a real discount rate was appropriate. RT Vol. 195 at 119-20. Accordingly, he reduced his discount rate to 4 percent. He acknowledged that the Kansas discount rate of 3 percent was correct, but he added a 1 percent risk premium to account for the uncertainty in future agricultural prices and production conditions. RT Vol. 195 at 120-22.

Professor Wichelns cites three publications concerning uncertainty in the future of agriculture. Colo. Exhs. 1166, 1167 and 1168. These data, however, were not recent, and only Colo. Exh. 1166 relates specifically to the Kansas high plains area. That paper is a theoretical study on the impact of prices and energy costs on agricultural production. Not surprisingly, it concludes that production levels are "sensitive" to changes in energy and commodity prices. Colo. Exh. 1166 at 10. Indeed, with sufficiently low crop prices and high natural gas prices of $7.00/mcf, it found that agriculture in western Kansas "was essentially eliminated." *Id.* at 10. These were late 1980 projections, and it is worth noting that 1998 natural gas prices were only $1.20/mcf according to Colorado evidence, and $2.19/mcf in the Kansas analysis (compared to $7.00 in the study). Colo. Exh. 1096, Table

CO-A8; Kan. Exh. 1092, Table A8. But using a scenario that projected increases in both commodity prices and energy costs, the study showed little change in acreage. *Id.* Professor Barry, asked about the future of family farms, thought that the outlook was "bright" for well managed operations, and that they will "find niches in which they can continue to thrive and compete successfully." RT Vol. 189 at 88-89.

Professor Wichelns did not link the claim of uncertainty in future agriculture to any degree of probability. Nor did he support or explain his specific use of a 1 percent risk factor added to the discount rate as opposed to any other figure. The 1 percent increase, of course, has the effect of decreasing the Kansas claim. RT Vol. 181 at 76. Colorado cites *Douglass v. Hustler Magazine, Inc.*, 769 F.2d 1128 (7th Cir. 1985) for the inclusion of risk in a present value analysis. There the court rejected an economist's opinion of future earnings because he failed to adjust the discount rate for the "extreme riskiness" of the future earnings stream. Colo. Closing Br. at 67. While this case perhaps offers a refreshing departure from economic journals, the uncertainty associated with the future earnings of a nude model suing Hustler Magazine may have limited relevance in assessing the future of agriculture in Kansas. The Seventh Circuit in the *Hustler* case also noted that a discount rate, without risk and without inflation, might be as low as 2 percent. 769 F.2d at 1143.

While certainly there can be legitimate disputes over the selection of a particular discount rate, I believe that the weight of the evidence here supports the 3 percent rate used by the Kansas experts. Professor Barry, as well as Professor Whittlesey, testified that the discount rate

used was "fair and appropriate." RT Vol. 189 at 87; RT Vol. 181 at 75. Many of Professor Barry's publications deal specifically with the issue of risk. Kan. Exh. 973.

B. Conclusion.

Increased regional pump costs, both historic and future, are appropriate damages suffered by Kansas. Future cost estimates should be discounted at the 3 percent rate used by Kansas. Pumping costs should be calculated in accordance with Kansas' evidence except, as may be relevant, for any adjustments included in Section V.

SECTION VII

CROP PRODUCTION LOSSES

The largest component of the Kansas damage claim is based upon the regional loss of farm income due to surface water depletions. The claim relates to those lands irrigated by surface water only, that is, those lands within the ditch service areas that did not have supplemental wells. In 1950 those lands included approximately 29,000 acres out of a total of some 50,000 irrigated acres. By 1994, the surface water only lands had decreased to 8709 acres. Kan. Exh. 892, Section C at 4; Table C1. The number of wells increased from 282 in 1950 to 618 in 1988. Colo. Exh. 1076 at 3-4, Table 2. For the period 1950-94, Kansas asserts damages for crop losses due to depletions of Stateline flows in the sum of $45,106,973. Kan. Exh. 1092, Table C10. This total amount consists of tax adjusted on-farm losses of $4,378,342 in nominal dollars, namely, the actual dollar value of the losses in the year incurred, from 1950 to 1994, together with $40,728,631 in prejudgment interest which includes both inflation and lost investment opportunities.

Colorado did not dispute the fact that depletions of headgate deliveries to lands irrigated only by surface water "caused some reduction in income," and that crop production losses were an appropriate category of damage. Colo. Closing Br. at 98; RT Vol. 193 at 72. The amount of loss, however, was vigorously contested. Colorado estimated the actual year-to-year farm losses, adjusted for taxes, at one-third of the Kansas claim, namely $1,321,220. Colo. Closing Br. at 13. Adjusted for inflation only, Colorado put these losses at $4,091,464. Colo. Exh. 1253.

Colorado did not include any other element of prejudgment interest.

Estimating production losses was greatly aided by a number of agreements between the states. To begin with, the amount of the shortage of surface water was agreed upon. For the period 1950-94 depletions in headgate deliveries to surface water only lands totaled 72,036 acre-feet. Stipulation, Table 4B; RT Vol. 178 at 128. Of such amounts, 65% would have been consumptively used by crops. The figure of 65% is the same as the evapotranspiration (ET) rate of the crops, and the terms "ET" and "consumptive use" were used interchangeably. The remaining 35% of headgate deliveries would have been return flows, not consumed by the crops. Kan. Exh. 892, Section C at 8; Colo. Closing Br. at 71. Crop prices were agreed to, as well as the crop mix as it varied over time. Kan. Exh. 892, Section C at 7; Colo. Exh. 1096 at 58-59. The crops involved in the damage assessment were alfalfa, winter wheat, and grain sorghum (or "milo" to local farmers). The 1998 Stipulation also included the annual water requirements on an acreage basis (taking into account rainfall), and the amounts of water actually delivered. Stipulation, Table 4B, cols. e, f. For the period 1950-94, average water requirements were 2.19 acre-feet per acre, while deliveries averaged only 1.08 acre-feet. *Id.* This is a "water short" region and the shortage in meeting the full consumptive use requirements of the crops, entirely apart from the depletions, averaged 36,459 acre-feet annually. Stipulation, Table 4B, col. af. In proposing a water remedy, Colorado recognized this chronic shortage and assumed that the Kansas farmers could beneficially

use, on average, 30,000 acre-feet of additional river flows. RT Vol. 211 at 118, 121-23; Colo. Exh. 1205, Table 1.

The Kansas approach to establishing crop losses and lost income was unexpectedly simple. It rests upon the linear relationships between additional water available for consumptive use, i.e., ET, and crop yields. Up to the point where crops no longer can make use of additional water, more water produces more crop yield. Conversely, the depletions in usable Stateline flow decreased the yields of alfalfa, winter wheat and sorghum that otherwise would have been realized. Colorado experts did not dispute, in general, the linear relationship between ET and crop yield. RT Vol. 196 at 146; RT Vol. 197 at 81-82; Colo. Exh. 1085 at 5. However, they were of the view that the particular linear crop yield response coefficients used by Kansas were not sufficiently reliable to determine the increase in yields that would have occurred if there had been no depletions of headgate deliveries to the surface water only lands.

A. The Kansas Evidence Establishing Crop Losses.

The Kansas experts relied upon a number of studies indicating that the crop yield response to water is linearly related to the water consumed by the crop. Kan. Exhs. 920-21, 924-25, 927, 930, 933, 936, 964, 966-72. Colorado's expert also acknowledged that the underlying principle of a linear crop yield versus ET relationship has "long been understood." Colo. Exh. 1085 at 5. The relationship

takes the form of a simple linear equation.[9] Plotting the equation, the important coefficient is the slope, which is the incremental ratio between yield and ET. It predicts the incremental increase in yield that results from an incremental increase in ET. Thus, from the slope value one can determine how many bushels of increased yield of wheat or grain sorghum, or tons of alfalfa, would have been realized for a given amount of increase in water consumed by the plant.

Based upon various studies, and conversations with Professor Loyd Stone of Kansas State University, Professor Whittlesey adopted the following values: 0.15 tons per acre per acre-inch of ET for alfalfa; 4.5 bushels per acre per acre-inch of ET for wheat; and 9.0 bushels per acre per acre-inch of ET for grain sorghum. Kan. Exh. 892, Section C at 9. Using these values, Professor Whittlesey was able to determine what the increased crop yields would have been in the absence of depletions, and since crop prices were known, to convert the lost yield into a change in gross farm income. Harvest costs were deducted and tax adjustments made to reflect on-farm annual lost income from 1950 through 1994. Losses included deficiency payments in some years, which were not at issue.

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[9] $Y = mX + b$

Where:

Y = crop yield in units per acre

X = evapotranspiration (ET), acre-inches/acre

m = change in yield per unit of ET

b/m = threshold level of ET for crop yield to begin

1. *Alfalfa.*

The yield function for alfalfa was derived from a comprehensive report published in 1981 by Theodore W. Sammis.[10] This study was based upon five sites in New Mexico, but earlier studies in Nebraska, North Dakota and Nevada were also reviewed in this report. Kan. Exh. 933. The study concludes that alfalfa yield is a "linear function of evapotranspiration," and yield functions averaged 0.1571 tons per acre per acre-inch. Kan. Exh. 933 at 324; Kan. Exh. 963 at 2. Professor Whittlesey in his calculations used a yield function of 0.15. The research reported in the Sammis paper was conducted making water the only variable in controlling growth. Kan. Exh. 933 at 323. Different amounts of water were supplied to create "various levels of water stress." *Id.* at 324. The consistency of the New Mexico results, compared with studies from other states, showed that the "relationship between alfalfa growth and evapotranspiration is independent of where the alfalfa is grown." *Id.* at 328; RT Vol. 187 at 78-80. The Sammis results were later confirmed in a paper published by Marvin E. Jensen reporting on studies in California, Idaho, New Mexico, North Dakota and Nevada. The composite alfalfa yield function from the Jensen paper was 0.1961 tons per acre per acre-inch. Kan. Exh. 963 at 2, Table 2.

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[10] "Yield of Alfalfa and Cotton as Influenced by Irrigation," published in the Agronomy Journal, Volume 73, March-April 1981. Kan. Exh. 933.

The 0.15 value used by Kansas for alfalfa was not accepted by Colorado, but neither was it seriously challenged by Colorado experts in the same way they disputed wheat and sorghum values.

2. *Winter Wheat and Grain Sorghum.*

About two years before this trial segment of the case, while Professor Whittlesey was preparing his basic report for Kansas, he consulted with Professor Loyd R. Stone of Kansas State University.[11] Professor Whittlesey's initial call related to a 1995 publication of which Professor Stone was the lead author. Kan. Exh. 934. Professor Whittlesey had three questions for Professor Stone: (1) whether the crop-ET relationships for wheat and sorghum were indeed linear; (2) whether the slope values in Stone's 1995 publication were appropriate for estimating long-term crop yields (RT Vol. 206 at 107; Kan. Exh. 934 at 14); and (3) if not, what the values should be. RT Vol. 206 at 109. Professor Stone replied in the affirmative to the first

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[11] Professor Stone was later called as a rebuttal witness. His qualifications appear in Kan. Exh. 1081. He has been a Professor of Agronomy at Kansas State University since 1983, and is a Fellow of the American Society of Agronomy. About 90% of his time has been devoted to research, and much of this has been done at Tribune, Kansas, which is immediately north of the ditch service area and Hamilton County. RT Vol. 206 at 94, 100-101. His work has been focused primarily in the areas of soil physical properties and the efficient use of water, including the crop yield response to limited irrigation. His publications include 48 technical, refereed papers, a number of which deal specifically with the crop yield-ET relationships at issue in this case.

question, but in the negative to the second. *Id.* at 107-09. The values in his 1995 publication were 6.03 for winter wheat and 12.20 for grain sorghum which reflected the results from test plots. In answer to the third question, Professor Stone recommended that the test plot data be reduced by about 25%, that is, to 4.5 for wheat and 9.0 for sorghum. *Id.* at 109. These were the values that Professor Whittlesey then used in his expert report. Kan. Exh. 892, Section C at 9. The 25% reduction was calculated to adjust the controlled experimental data to "realistic long-term type conditions" in western Kansas, including high temperatures, winds, insects, and other stressful conditions. RT Vol. 206 at 129-30; see also RT Vol. 181 at 105-09.

Much of the research on the yields of wheat was done by or under the supervision of Professor Stone at Tribune, Kansas. His values were supported by data from both dry land and irrigated studies. The dry land studies extended over the period 1973-88. RT Vol. 206 at 120; Kan. Exh. 1071, Table 6 at 359; Kan. Exh. 1082, Table 1. Irrigated studies were conducted during 1977-79, and the results published in a peer-reviewed journal. RT Vol. 206 at 122-23; Kan. Exh. 1072, Table 5 at 635. The crop-ET relationship recommended by Professor Stone, and used by Kansas, is also supported by United States Department of Agriculture studies. Kan. Exh. 1083; Kan. Exh. 969, Figure 1 at 982. One of these studies performed at the USDA research facility in Bushland, Texas, extended over the period 1978-92 and involved fourteen irrigated fields, as well as dry land test data from 1958-91. Kan. Exh. 969 at 981-82; RT Vol. 207 at 20-24.

3. *Grain Sorghum.*

Grain sorghum studies were also conducted at Tribune, Kansas. These too included dry land studies, that is, relying upon rainfall only without irrigation, over the period 1973-88. RT Vol. 206 at 112-13; Kan. Exh. 1071, Table 8 at 360; Kan. Exh. 1082, Table 2 at 5. They also included irrigated studies conducted at Tribune during the period 1974-87. These were published in a peer-reviewed journal in which Professor Stone again was the lead author. RT Vol. 206 at 115-17; Kan. Exh. 936, Table 3 at 255. The linear crop yield-ET relationship, and value, established by these studies were also supported by a 1961 United States Department of Agriculture publication. Kan. Exh. 1047.

B. Colorado's Alternate Approach.

Colorado's experts vigorously disputed the Kansas analysis with respect to wheat and grain sorghum. They argued that the data from the various controlled experiments could not be used to predict yields under actual field conditions; that the study data did not take into account the timing of water applications; and that the experiments did not capture the variability caused by insect damage, hail storms, and other weather events. Moreover, Professor Wichelns testified that the fundamental assumption of the Kansas analysis, namely, that these crops could always use more water, was "totally

unreasonable."[12] Colo. Exh. 1096 at 59. He found the results of the Kansas analysis to be "completely unrealistic," and therefore he developed "an alternate approach" to predict crop losses resulting from depletions of usable flow from the Arkansas River. Colo. Exh. 1096 at 59-65, 73-86.

In his own analysis, Professor Wichelns constructed yield equations for different seasons to address the variability associated with the timing of water use. His equations also included a "random shock term" which was intended to capture the impacts of insect damage and weather events. RT Vol. 197 at 42-44. This was an estimated factor that did not come from any reported values. *Id.* at 50. The data used in Professor Wichelns' yield equations came from a 1962 unpublished Ph.D. dissertation by Amar Singh Sirohi. Colo. Exh. 1114; RT Vol. 196 at 74-75. The Sirohi data included both crop yields and the amount of water applied or available in specific months. Of significance in this case, the sources of water included not only irrigation deliveries, but also rainfall and preseason moisture. Colo. Exh. 1096 at 76.

Most of the data collected by Sirohi came from the Garden City experiment station, although some data were merely the result of a mail survey. RT Vol. 196 at 81-82. Professor Wichelns was unable to reproduce the Sirohi production functions from the data used, but nonetheless he continued to use the data, and developed his own functions. RT Vol. 196 at 82-85. However, after a day of

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[12] In its Closing Brief, however, Colorado states, "The ditches in Kansas were very water-short with or without depletions to Stateline flows." Colo. Closing Br. at 108.

cross-examination, Professor Wichelns acknowledged that the data were "not reliable" for the purposes for which he used them, and that unfortunately his approach had not worked out. RT Vol. 197 at 44-46. Kansas moved to strike this portion of his expert report, and in its Closing Brief, Colorado acknowledged that Professor Wichelns withdrew his analysis because the data on which he relied were "not appropriate." RT Vol. 197 at 68-69; Colo. Closing Br. at 78.

The problem with Professor Wichelns' analysis, however, runs deeper than merely the data involved. The Sirohi yield figures clearly involved available water supplies in excess of the ET or consumptive use requirements of the crops. Excess water becomes runoff and does not contribute to crop yield. RT Vol. 196 at 131, 140. Kansas introduced several exhibits comparing the consumptive use requirements of the Sirohi crops with the actual water supply made available. Kan. Exh. 1049, 1050, 1051*. In almost all of the Sirohi experiments, substantial amounts of extra water were available. RT Vol. 196 at 132, 136, 138; RT Vol. 197 at 9, 11-12, 17-18. Yet in attempting to plot the relationships between consumptive use and the yields for alfalfa, wheat and sorghum, Professor Wichelns plotted *all* of the data points, including those showing no change in yield because of the excess water. RT Vol. 196 at 142-44; RT Vol. 197 at 14-17. Professor Wichelns had to acknowledge that the Sirohi data were not representative of water short conditions, and to the extent that water is applied when the crop has a full supply, there is no increase in yield. RT Vol. 196 at 143; Kan. Exh. 1002 at 27. The data plotted in excess of the ability of the crops to use water affected both the shape and values of the equations

developed by Professor Wichelns. Yet he still sought to apply those data "to strictly consumptive use supplies." RT Vol. 197 at 34.

C. Colorado's Objections to the Kansas Analysis.

One of Colorado's expert witnesses was Grant E. Cardon, Associate Professor, Department of Soil and Crop Sciences, at Colorado State University.[13] Professor Cardon believed that the Kansas analysis results in a "significant over-prediction of yield losses" due to the depletions of usable Stateline flows. Colo. Exh. 1085 at 12. He emphasized two primary reasons for this opinion: (1) the linear crop yield-ET relationships on which the Kansas experts rely were developed under highly controlled, homogenous conditions that do not apply under average farm conditions; and (2) the crop yield-ET test data do not reflect the differences in yield that depend upon when water is applied during growth stages. Colo. Exh. 1085 at 5, 7-10.

In his expert report, Professor Cardon does not acknowledge that Professor Stone, in his first conversation with Professor Whittlesey, recommended that the test data values be reduced by approximately 25 percent to account for average field conditions. Nor does Professor Cardon in his testimony explain why the 25 percent

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[13] His qualifications are found in Colo. Exh. 1084. His B.S. degree is in agronomy; his Ph.D. degree in soil science. He has been at Colorado State University since 1992, and has published a number of refereed journal articles.

adjustment is not appropriate to account for the difference between controlled experimental data and its application in the field. RT Vol. 192 at 51-69; see also RT Vol. 181 at 104-09. The results of the various studies, reduced by approximately 25 percent, were in fact the values used by Professor Whittlesey in his analyses for Kansas.

Professor Stone, who made these recommendations, has 25 years of experience in the farm lands of Kansas affected by the depletions; he has been personally involved in much of the research; he has outstanding academic credentials; and he has to his credit a long list of peer-reviewed publications which deal with some of the specific issues in this case. RT Vol. 207 at 26; Kan. Exh. 1081. But of special importance, Professor Stone rendered his opinions long before this segment of the trial began, and outside of a litigation context. Kansas did not include him originally as an expert witness. He was called in rebuttal only after Colorado experts aimed criticism at his work. As a rebuttal witness, and despite vigorous cross-examination, his opinions were unshaken, namely, that the ET crop yield relationships for winter wheat and grain sorghum are linear, and that the values used by Kansas are appropriate for average farm conditions within the ditch service areas. I believe that Professor Stone's testimony is entitled to great weight. It should also be noted that neither Professor Wichelns nor Professor Cardon could cite to anything in the literature to support their views that the many crop yield-ET studies were not applicable under field conditions. RT Vol. 192 at 13; RT Vol. 197 at 101-02.

The values used by Professor Whittlesey were also supported by the testimony of C. Eugene Franzoy, an agricultural engineering expert with wide experience in the area of crop yield response to water.[14] Kan. Exh. 963; RT Vol. 187 at 67, 78, 87, 90-91, 99.

As to the issue of timing, many of the studies plainly timed irrigation applications over various stages of plant growth, also with different amounts of water. Kan. Exh. 969; RT Vol. 197 at 75-77. Dry land studies, of course, by their very nature depend upon rainfall only, and receive water – or a lack of water – at all stages of plant growth. Grain sorghum studies showed no significant difference in yield, whether water was applied "at boot or at bloom or at soft dough" stages. Kan. Exh. 936, Table 3 at 255; RT Vol. 207 at 123. Though water came at different times and in different amounts, sometimes applied deliberately to evaluate water stress, the linear relationships held up.[15]

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[14] Mr. Franzoy qualified as an expert previously during earlier phases of the trial. Kan. Exh. 785. He has provided expert irrigation and water resources management services in connection with numerous water projects, water rights lawsuits, legislation, Indian tribal claims, and planning studies. He assisted New Mexico in the Texas litigation on the Pecos River.

[15] This colloquy with Professor Wichelns bears on the issue:

"[MR. DRAPER] Q. So isn't it fair to say that the linear relationship shown in Figure 1 is independent of timing considerations within the season?

A. No, sir, not at all. We've just discussed that these data have been generated by looking at timing issues. Hence, these data points are not generated independent of timing issues.

Kan. Exh. 936; RT Vol. 207 at 123; Kan. Exh. 969, Fig. 1 at 982; RT Vol. 206 at 113-14; RT Vol. 207 at 22.

SPECIAL MASTER: But isn't the point that they still turn out to be linear?

THE WITNESS: I'm sorry, Sir?

SPECIAL MASTER: Isn't the point that, even though there's different timing – they're done without respect to critical timing and so forth – they all still turn out to be linear? Isn't that the point of this?

THE WITNESS: I guess the point, if I understand the point, is that there's a scatter of data points generated here as a result of the experiments, and then the experimenters estimate a linear relationship.

SPECIAL MASTER: Well, this paragraph on page 981 [Kan. Exh. 969] appears to say that sometimes they gave the plant water when it needed it, sometimes when it didn't, sometimes at one growth cycle, sometimes at another, all reflecting different timing patterns, but the results still turn out to be linear.

THE WITNESS: Yes, that appears so, your Honor. But I might note that in this description we just read, there are some methodological issues in these experiments such as irrigating to establish maximum yields, such as selecting particular times at which to stress or not to stress the plants.

I don't know if I would want to conclude from this that the variability observed in true production conditions would provide a similar scatter because, nonetheless, there is still an experimental design behind these data that may not reflect the production conditions.

SPECIAL MASTER: Well, I understand that. But this does apparently reflect – Figure 1 apparently does reflect the results of some applications that had a lot of variability in them and some different kinds of timing?

THE WITNESS: I believe so." RT Vol. 197 at 77-78.

There is no question but that the timing of *applied* water makes a difference in crop yields. Farmers try to schedule irrigation at times when the crops need water, when it will do the most good. However, the timing of applied water is not the same as timing effects on the relationship between consumptive use and yield. RT Vol. 187 at 81. Water may be available at the best of times, or at the worst of times, and the crop yield certainly may be affected by that timing. However, whenever water is applied, more water will still result in more yield, so long as there is an ET deficit. Nor did Colorado explain why plot studies that were exposed to normal weather conditions did not reflect the impact of insects, hail, wind and frost.

On redirect examination, Professor Wichelns expressed a number of new opinions, highly critical of the Kansas analysis, opinions that were not included in his original expert report. Colo. Exh. 1096. He contended that the crop-ET relationships used by Kansas were not based upon standard regression analysis techniques, and that the equations were not valid for purposes of predicting crop yield as a function of ET. RT Vol. 210 at 123, 152 *et seq*. These were highly technical issues. It is perhaps sufficient here to state that the Colorado criticisms were substantively refuted by Professor Stone when he was called as a rebuttal witness.

D. The Lack of Wells.

Professor Wichelns prepared an analysis of crop income during the 1950s and 1960s, together with the costs of drilling and operating wells. Colo. Exh. 1096 at 93-98. He concluded that during this period of time the increases in expected revenue resulting from supplemental wells would have exceeded their costs "by a considerable margin." *Id.* at 97. In his opinion, "reasonable farmers" would have made investments in wells rather than relying solely upon limited and uncertain surface water supplies. *Id.* at 97. Another Colorado expert, Professor Richard Adams, was of the same view. Given the value of water implied by the Kansas experts, which was many times higher than the cost of pumping, Professor Adams testified that he would "expect every acre of farm land to be irrigated by wells." Colo. Exh. 1203 at 8. The inference to be drawn from the lack of wells, according to these experts, is that Kansas overestimated crop losses and the value of surface flows. It should be noted, in passing, that beginning in early 1977 the drilling of new wells within the ditch service areas was restricted. RT Vol. 35 at 124-25; Jt. Exh. 82.

Given the hindsight of present day economists, it might have been profitable for everyone to drill supplemental wells in those early years. However, there are many reasons why this may not have been done, and the failure to drill wells does not by itself indicate that Kansas' estimate of crop losses is too high. The favorable economics of drilling wells may not have been understood at the time. Quality information regarding costs and returns was not readily available. RT Vol. 211 at 31.

Some farmers, for reasons of age or otherwise, may not have wanted to go into long-term debt. Some farmers may not have had the available capital, or the credit to borrow. Many farmers were "cash poor." *Id.* at 32. Some farmers may have been averse to risk. Some farmers may have been tenants, and the landlord may not have been willing to undertake the necessary investment. Some farms may have been small in terms of total acreage, or the acreage spread out over space, so that it was not feasible or practical to consider a well investment. RT Vol. 208 at 37-39. Capital for well investments, with three to ten year repayment periods, was less available than for long-term investments. RT Vol. 211 at 32.

Given the perceived economic benefits of supplemental wells, Professor Wichelns concluded that it was "very unlikely," indeed, that farmers continued to produce crops on the surface water only lands during the 1960s and 1970s. Colo. Exh. 1096 at 97. But this conclusion is contrary to the Stipulation between the parties. The November, 1998 Stipulation was based upon the Garden City study by the Kansas Division of Water Resources in 1988, and finds that some 17,000 acres of land were still irrigated during the 1970s by surface water only. Colo. Exh. 1096 at 53-54.

E. Implied Value of Water.

One of Colorado's principal experts was Professor Richard M. Adams of Oregon State University.[16] Professor Adams prepared a short expert report for Colorado assessing the value of the water estimates implied in the Kansas expert reports. Colo. Exh. 1203. Professor Adams calculated an acre-foot value for the surface water depletions by dividing the depletions for a year into the value of crop losses claimed by Kansas for that year. Colo. Exh. 1203 at 5. As a result, for the 1950-94 period, he estimated that the average value of water implied by the Kansas analysis was $65 per acre-foot in nominal dollars. Colo. Exh. 1203, Table 2. Adjusted to 1994 dollars, by an index of prices received by farmers, the value is $109 per acre-foot. *Id.*

Professor Adams then compared this implied value of depletions in Kansas with the marginal values of water for specific crops found in a search of the relevant literature. The results are summarized in Colo. Exh. 1203, Table

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[16] Professor Adams' qualifications are found in Colo. Exh. 1202. He has been a Professor of Agricultural and Resource Economics since 1983. He has more than 200 books, chapters in books, journal articles and papers to his credit. His work includes a broad range of consulting assignments, including work for the U.S. Environmental Protection Agency, and a study of the economic concepts involved in valuing groundwater for the National Academy of Sciences. Professor Adams has also served as co-editor of the American Journal of Agricultural Economics, was an associate editor for water resources research, and was on the editorial board of the Journal of Economics and Management.

1, and show prices not only for alfalfa, wheat and sorghum, but also for cotton, sugar beets, lettuce, carrots and vegetables generally. Adjusted to 1997 dollars, the values range between $10 and $455 per acre-foot. Colo. Exh. 1203, Table 1. From his literature review, Professor Adams concluded that the values implied by the Kansas analysis were unreasonably high, and that the damage claims for crop production losses should be reduced by two-thirds to three-fourths. Colo. Exh. 1203 at 8.

On cross-examination, Professor Adams categorized the literature values into either short-run or long-run situations. RT Vol. 200 at 105-125. Loosely put, the distinction appears to rest upon what fixed or development costs may be included in the transfer. The important point here, however, is that none of the literature values reported by Professor Adams dealt with what was termed a "short-short run" situation, that is, an intra-seasonal transaction in which no capital costs were involved, and only additional harvesting and irrigation costs would be required. Professor Adams acknowledged that the Kansas analysis did indeed involve such a short-short run situation, and that the literature values he reported were not "comparable to the values that are relevant in this case." RT Vol. 200 at 120-121; RT Vol. 208 at 97. The short-short run or intra-seasonal values would generally be higher than the values of water in the reported short-run or long-run situations. RT Vol. 200 at 111, 114. Moreover, there was evidence of a recent two-year transfer of water between the Palo Verde Irrigation District and the Metropolitan Water District in California at $143 per acre-foot. Kan. Exh. 1089; RT Vol. 211 at 95-96. James Lochhead, the former Director of the Colorado Natural Resources

Department, appearing for Colorado on the possible water remedy in this case, testified that the cost of acquiring water in the Arkansas Basin might be higher than the $143 per acre-foot figure used in the California transfer.

F. Conclusion.

The regional loss of farm income due to depletions of usable Stateline flow is an appropriate element of damage. The crops grown within the ditch service areas are water short, and the Kansas analysis is a reasonable method of estimating the reduction in crop yield and the loss of gross farm income due to the depletions. The results of the Kansas analysis should be used, except that additional labor costs to be deducted should be consistent with Section V.

SECTION VIII

SECONDARY ECONOMIC DAMAGES

The Kansas claim includes secondary or indirect losses to the economy of the state as a whole. These are damages that result from the direct impacts of depletions of usable Stateline flows, namely, crop losses and increased pumping costs within the ditch service areas, and additional regional pumping costs caused by lower groundwater levels. If any change is made in these direct impacts, the secondary damages will also be affected. Kansas estimates its secondary economic losses at $3,793,486. Kan. Exh. 1092, Table D6. This amount includes both historic and projected future damages, each brought to a 1998 dollar value, and includes prejudgment interest for the historic period of 1950-94.

Colorado does not have an estimate of secondary damages. While Professor Wichelns acknowledges that "there may have been some secondary economic effects" due to depletions of surface supply, he believes they would have been "very, very small." RT Vol. 193 at 81. In his opinion, there is no method to estimate such effects accurately, and they should not be addressed. *Id.* at 97.

Kansas employed two specialist experts to assist in calculating secondary damages, Professor Joel R. Hamilton and Dr. M. Henry Robison. Both hold impressive credentials.[17] Colorado chose not to engage a separate

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[17] Hamilton's qualifications are found in Kan. Exh. 938. He is a Professor of Agricultural Economics and Statistics at the University of Idaho; has international experience in China, Sri Lanka, Pakistan, India, Eastern Europe, and Australia. He

expert for secondary damages, and Professor Wichelns who was Colorado's chief economic expert on all other issues had only limited experience with input-output models. Rather, Colorado chose to rely primarily on vigorous cross-examinations of Professor Hamilton and Dr. Robison, and upon a legal objection made to all of Kansas' expert testimony on secondary economic impacts,

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testified for the State of New Mexico on secondary economic damages in *Texas v. New Mexico*. He has written numerous peer reviewed articles on secondary economic impacts, many of which involve the kinds of issues present in this case. Most recently, as Chair of the Independent Economic Analysis Board of the Northwest Power Planning Council, he provided technical review and oversight of the economic studies on proposals to "breach" four dams on the lower Snake River. These studies are being conducted by the U.S. Army Corps of Engineers as part of a potential salmon recovery project. Breaching the dams would essentially eliminate water storage, and reduce the water supplies for agriculture and hydro power. RT Vol. 206 at 33-34. The input-output model being used to assess secondary economic impacts from these proposals is IMPLAN, the same model used by Kansas experts in this case, and the model looks 100 years into the future. Kan. Exh. 1084; RT Vol. 206 at 35-36, 72-73.

Dr. Robison is President of Economic Modeling Specialists, Inc. His qualifications appear in Kan. Exh. 961. He is the person who constructed the regional IMPLAN model used in this case to assess secondary economic impacts in Kansas. He has constructed hundreds of IMPLAN models for the U.S. Forest Service and for the Department of Commerce, and currently has a major assignment for the Federal Highway Administration. He has also assessed secondary economic impacts, using IMPLAN, for the States of Idaho, Utah, Colorado and New Mexico, and for many cities and regional governmental agencies. His writings in peer reviewed journals address many of the issues involved in this case.

based upon the standards in *Daubert* and *Kumho Tire Co.*[18] The Colorado objection was overruled by written Order dated May 1, 2000, and included as Exhibit 8 in the Appendix.

In assessing secondary impacts to the economy of Kansas as a whole, the Kansas experts used an input-output form of analysis that is generally recognized in the field of economics. Specifically, they employed an input-output model known as IMPLAN. This is a national level model originally developed by the U.S. Forest Service and now maintained by the Department of Commerce. Kan. Exh. 892, Section D at 5; RT Vol. 186 at 57, 61-62. It has now been coupled with county level economic data made commercially available by the Minnesota IMPLAN Group, located at the University of Minnesota. Kan. Exh. 962, RT Vol. 186 at 59. Dr. Robison, personally, has constructed hundreds of IMPLAN models to assess secondary economic impacts for various departments of the federal government, for several states, and for numerous local agencies. RT Vol. 186 at 50-52; Kan. Exh. 961. IMPLAN is the "most widely used" model for assessing secondary economic impacts. RT Vol. 185 at 80; RT Vol. 186 at 26. More information on input-output modeling appears in my Order on Colorado's *Daubert* motion, included as Exhibit 8 in the Appendix.

Dr. Robison constructed the model used by Kansas in this case. It traces the ripple effects of the depletions

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[18] *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 125 L.Ed.2d 469, 113 S.Ct. 2786 (1993); *Kumho Tire Co., Ltd. v. Carmichael*, 526 U.S. ___, 143 L.Ed.2d 238, 119 S.Ct. 1167 (1999).

within the ditch service areas, and upon the adjacent region, throughout the statewide economy. Some of these impacts are regarded as "gains" while some are "losses." Increased pumping expenses and less net farm income within the ditch service areas are adverse to one sector of the economy, but advantageous to the segment that profits from increased well pumping.[19] The model determines the net effects, and in this case calculates, overall, net losses to the Kansas economy. Kan. Exh. 892, Section D at 9-12; RT Vol. 206 at 16-17. A summary of the gains and losses appears in Kan. Exh. 1092, Table D6.

It is ironic that professional economists treat the economic activity associated with the additional use of groundwater, that is, with a permanent exhaustion of a natural resource, as an economic "gain" which is to be offset against an acknowledged "loss" of net farm income. Nonetheless, this appears to be an accepted practice, and in this case represents a conservative approach to Kansas' damages.

Secondary economic impacts are also affected by a concept known among economists as "opportunity costs."[20] This term refers to the "next best alternative employment of a resource," and is a method for reducing

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[19] Dr. Robison testified, "It's the old irony with economists. Even a tornado benefits windowpane sellers. And there's no doubt that if you deprive the Kansas economy of water, you'll benefit pump dealers." RT Vol. 186 at 120.

[20] This is slightly different from the use of the term in connection with prejudgment interest, where it relates to the investment opportunities of funds which a person should have had.

gross secondary impacts to the net gains or losses affecting an economy. RT Vol. 185 at 131, 144. In this case, the Kansas experts determined that opportunity costs offset all but 20 percent of the secondary impacts. That is, 80 percent of secondary impacts were assumed to represent factors moving to or from the next best opportunities elsewhere in the economy. Kan. Exh. 892, Section D at 7. Only 20 percent of the total secondary impacts were counted as net gains or losses. *Id.*; RT Vol. 185 at 124. Some economists have argued that this is "too restrictive," and that a larger percentage should be used to determine net secondary impacts. Kan. Exh. 947; RT Vol. 185 at 116-18.

On cross-examination, however, Colorado suggested that the 20 percent factor should be lower, or at least that it was not proven with reasonable certainty. Colorado offered no figure of its own. While the 20 percent factor is based upon the analyst's judgment, there is ample evidence to support its use. RT Vol. 206 at 88. The seminal work on the subject is a book by Haveman and Krutilla evaluating opportunity costs for the kinds of resources used in water projects. Kan. Exh. 949; RT Vol. 185 at 105. Their study involved some 100 projects in all parts of the country. RT Vol. 185 at 105-108. Opportunity costs ranged from 69 to 94 percent; that is, net secondary impacts fell between 6 and 31 percent. Kan. Exh. 949, Table 21; RT Vol. 185 at 147. Support for 20 percent can also be found in *Texas v. New Mexico*, where experts for both states used 20 percent (RT Vol. 185 at 120; RT Vol. 206 at 24); the Colorado-Big Thompson project, 20 percent (RT Vol. 185 at 131); the State of Washington study in regard to a prohibition on grass seed burning, low of 20 percent (Kan. Exh.

1085; RT Vol. 186 at 33); Bergmann and Boussard international study in France, 10-20 percent (Kan. Exh. 1004; RT 206 at 9-10); Bureau of Land Management Study on making additional land available for agricultural irrigation, 10-20 percent (Kan. Exh. 944; RT Vol. 185 at 96).

In the final analysis, Colorado argues that the Kansas evidence on secondary economic impacts is not sufficiently reliable or certain to support a damages award. Colo. Closing Br. at 102. It is true that the Kansas damage claim is an estimate, and involves the judgment of its experts. But the law does not require that scientific testimony be known "to a certainty." *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 125 L.Ed.2d 469, 113 S.Ct. 2786 (1993). Although "good grounds" must support an expert's testimony, the process followed is also important. *Id.* at 590. Here, the Kansas experts used a methodology, and a specific input-output model, that have been "widely adopted and widely accepted" for measuring secondary economic impacts, and constitute the "most reliable" approach that can be used. RT Vol. 186 at 26; RT Vol. 187 at 50; RT Vol. 206 at 10-11; Kan. Exh. 1010. The Kansas experts testified that the results provide a "reasonable estimate" of secondary impacts and a "reasonable quantification" of damages. RT Vol. 206 at 16, 38; RT Vol. 187 at 50-52. The very input-output model, and the very people, used by Kansas to assess secondary impacts here are currently being used extensively by the federal government for the same purpose. The approach of the Kansas experts was conservative and professional. We can anticipate that their testimony will be carefully examined in the profession because of the time span over which the input-output analysis has been used. However,

there is now evidence the Corps of Engineers is using IMPLAN to look ahead 100 years. Kan. Exh. 1084; RT Vol. 206 at 35-36, 72-73. And current models are much more accurate than those used even ten years ago. RT Vol. 187 at 37.

A. Conclusion.

I find that the weight of the evidence supports the Kansas claim for secondary economic damages. They may have to be recalculated, depending upon any revisions to the underlying damages, but the methodology used by the Kansas experts should be employed in making any such final damage estimates.

SECTION IX

FEDERAL AND STATE INCOME TAXES

Kansas reduced its damage claim to account for federal income taxes that would have been paid on increased farm net income. Kansas experts reasoned that without depletions of Arkansas River water, the net income of farmers would have been greater, but a portion of that increase would have been paid to the federal government in taxes. The federal share would not have been a loss either to the farmers or to the State of Kansas, and so it was deducted from Kansas' damages. Colorado acknowledged that the higher the marginal rate that was used to estimate taxes, the lower would be the Kansas damages. RT Vol. 195 at 80. Not surprisingly, Colorado agreed with this approach. Kansas pointed out, however, that no such adjustment had been made by either state to the damage claims in *Texas v. New Mexico*. RT Vol. 203 at 28.

State income taxes were treated differently. These taxes, which would have been paid absent depletions, were considered to be a direct loss to the State of Kansas, and are included in its damage claim. Kan. Exh. 892, Section A at 26, Table A11. While Colorado took issue with the amount of foregone state taxes, it did not contest such loss as a component of damages.

A. Federal Marginal Tax Rates.

The states were in agreement that the federal tax adjustment should be made on the basis of marginal tax rates, not on average rates. The experts also agreed, by

the end of the evidentiary proceedings, that it is appropriate to reduce the statutory marginal rates to account for the tax management opportunities available to farmers. RT Vol. 195 at 86-87. These options include income averaging, loss carryover, investment credits, cash vs. accrual accounting, payment of salaries to family members, shifting income or expenses from one tax year to another, and depreciating or expensing capital items. Professor Wichelns did not adjust for these opportunities in his original report, but he came to accept a 15 percent reduction in the statutory marginal rates as being reasonable. RT Vol. 195 at 86-87; RT Vol. 199 at 87-88; Kan. Exh. 1075. Kansas had used a 15 percent adjustment from the outset. Kan. Exh. 892, Section A, at 23.

For much of the historic period in question, there was also agreement on the particular marginal tax rates to be used. The experts for the states agreed upon rates for the period 1950-66, and for 1985-96. Colo. Exh. 1148; RT Vol. 195 at 78. The disagreement was limited largely to the period 1970-84. RT Vol. 195 at 78; Kan. Exh. 892, Table A10; Colo. Exh. 1096, Table CO-A10. During the disputed period, Kansas rates (not including the 15 percent adjustment) remained largely at 19 percent. The rates used by Professor Wichelns for Colorado were mostly at 28 percent, but reach 40 percent in one year. Colo. Exh. 1148. Detailed tax information is not easy to obtain, even for experts, and both states attempted to find ways to estimate, on average, the net farm income and appropriate marginal tax rates applicable to the farms affected by the depletions of usable Stateline flow. I accept the use of averages, based upon the best data available, as the only

practical way to estimate the federal tax reduction to Kansas' damages.

Concentrating on the evidence for the 1970-84 period at issue, Professor Whittlesey relied upon data from two studies of Minnesota farms,[21] certain national farm and IRS statistics, conversations with several farmers within the ditch service areas, and the tax returns of one "representative" farmer. Kan. Exh. 907, 908; RT Vol. 183 at 74-79, 85-86; Kan. Exh. 898, Fig. A-3; RT Vol. 203 at 67-68. The tax returns of the "representative" farmer were used primarily for the earlier 1950-68 period, after which he was no longer a full-time farmer. RT Vol. 183 at 83-86; RT Vol. 203 at 67. Colorado's expert, Professor Wichelns, also relied upon the tax returns of this representative farmer for the 1950-66 period when he and Professor Whittlesey were in agreement. RT Vol. 198 at 115. Professor Whittlesey had localized data available from the Kansas Farm Management Association annual reports, but he did not initially derive his values from those data because of the way in which income was reported. RT Vol. 183 at 80-82, 88; RT Vol. 203 at 68. The Minnesota studies covered the periods 1967-78 and 1977-82, and involved 76 farms during the first study and 163 farms during the later period.

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[21] These were studies by Gregory D. Hanson and Vernon R. Eidman entitled "Agricultural Income Tax Expenditures – a Microeconomic Analysis" and published by the American Agricultural Economics Association (Kan. Exh. 907), and "Evidence of the Stability of Income Tax Expenditures to Farmers" published in the Agricultural Finance Review (Kan. Exh. 908).

RT Vol. 183 at 76-77; Kan. Exh. 908 at 71. Professor Whittlesey's conclusions, which he acknowledged were a matter of judgment, are found in Kan. Exh. 892, Table A10;[22] RT Vol. 183 at 88-89.

Professor Wichelns, for Colorado, testified that he relied upon the tax returns of four farmers in the ditch service areas,[23] and upon information in the Kansas Farm Management Association reports.[24] RT Vol. 195 at 69-73. Professor Wichelns disagreed with the sources of data used by Professor Whittlesey to estimate marginal federal income taxes because, he testified, "we have better sources of data available," pertinent to farmers in southwest Kansas. RT Vol. 195 at 67-68. I do not agree that the data used by Professor Wichelns are better, nor that his methodology produces a more appropriate estimate of federal marginal taxes paid.

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[22] These calculations were later revised to reflect corporate tax rates for the Garden City Company. Corporate rates are higher than individual marginal rates. RT Vol. 183 at 93-94, 96.

[23] To protect the confidentiality of these farmers' tax returns, they were designated merely as Farmers A, B, C and D. See Colo. Exh. 1148.

[24] The Kansas Farm Management Association is a membership organization that assists farmers in collecting and analyzing information on the financial performance of their farm operations. RT Vol. 193 at 147. The state association is divided into geographic regions. "Association No. 3" covers 23 counties in southwest Kansas and includes Hamilton, Kearny and Finney Counties. The Association report for 1972 shows 604 farm members in Association No. 3, of which 101 are located in Hamilton, Kearny and Finney Counties. Colo. Exh. 1154. There is no breakdown as to how many of these farms lie within the ditch service areas.

To begin with, of the four farmers relied upon by Professor Wichelns, only Farmer A's tax returns covered the whole period in question, while Farmer B's returns included about one-half of the period. The tax returns of the other two farmers essentially related to the earlier years when there was no disagreement with Kansas. There was no evidence to show that the marginal tax rates paid by Farmers A and B could reasonably be used to represent taxes paid over the whole ditch service area. Indeed, the evidence indicates the contrary, and it is questionable whether even these two farmers paid the marginal rates assigned to them by Professor Wichelns. His methodology was explained with reference to Farmer B for the year 1972. Professor Wichelns' spreadsheet showed "taxable income" for Farmer B in 1972 of $38,557. Kan. Exh. 1058. He then went to a table of statutory marginal tax rates for various levels of "adjusted gross income." Colo. Exh. 1147. These marginal tax rates are also shown on a table published by the U.S. Treasury Department which relates adjusted gross income to average and marginal tax rates. Kan. Exh. 1056; RT Vol. 198 at 121. Looking at this table in the column for adjusted gross incomes between $35,000 and $50,000, for a married couple with two dependents, one reads across the table to find a marginal tax rate of 40 percent for the year 1970. RT Vol. 198 at 121. This is how Professor Wichelns concluded that Farmer B was subject to a marginal tax rate of 40 percent in 1972, as reflected in Colo. Exh. 1148. Yet according to the Treasury Department table, a 40 percent marginal rate would equate to an average tax rate of 21.9 percent, and Professor Wichelns' own spreadsheet shows

that the average tax rate paid by Farmer B was only 14.67 percent. Kan. Exhs. 1056, 1058.

For the year 1972, however, Professor Wichelns actually adopted a marginal tax rate not of 40 percent, but 33 percent because of other Kansas Farm Management Association data. RT Vol. 199 at 94-95. Yet in the following year, 1973, he jumped the marginal tax rate to 40 percent, though his rates for Farmers A and B remained the same in both 1972 and 1973. Colo. Exh. 1148. The Kansas Farm Management Association report for 1973 shows that an average farm family in the southwest portion of Kansas paid only $2,949 in taxes (including self-employment tax) in 1973, based on average 1972 income of $33,542, or 8.8 percent paid in taxes. Colo. Exhs. 1154, 1155; RT Vol. 198 at 104-07.

Of more importance, however, is the apparent failure of Professor Wichelns to take into account the fact that many farmers paid little or no taxes. At the extreme, in 1981 average net farm income in southwest Kansas showed a loss of $13,339. Colo. Exh. 1157 at 20; RT Vol. 199 at 69. This was due to a severe freeze in May of that year. RT Vol. 199 at 69. The Kansas Farm Management Association report for that year called it "The Year Many Would Just as Soon Forget." Colo. Exh. 1156 at 6. Moreover, in 1982, net farm income in the area averaged only $15,701. Colo. Exh. 1157 at 20. While Finney County fared substantially better ($42,431), Hamilton County was just above the average ($18,800) and Kearny was slightly below ($14,487). *Id.* Nationwide, the 1980s were "bleak" years for farmers. Kan. Exh. 919 at 1. Even in the prosperous 1970s, farm income tax returns reporting a loss were about equal to those showing a profit, and in the

1980s loss returns outnumbered those with a profit almost two to one. *Id.*, Table 1; RT Vol. 203 at 33-34. Professor Whittlesey acknowledged that in all years the top income producers would be paying taxes, "but there are many who are not." RT Vol. 203 at 32. In setting a marginal tax rate, "there are losses which have to be averaged in." *Id.*, Kan. Exh. 1002 at 7.

On rebuttal, Professor Whittlesey also analyzed the Kansas Farm Management Association data on which Professor Wichelns relied for his marginal tax rates. Professor Whittlesey had not used those data directly in forming his initial opinion because they contained no analyses of tax records similar to those in the Minnesota farms study, and did not show "even actual taxes paid based on adjusted gross income." RT Vol. 183 at 83. He concluded that Colorado had used the "net farm income" data in the annual Kansas Farm Management Association reports to mean the same as taxable income – which it is not. RT Vol. 203 at 45-46; Kan. Exh. 1002 at 6. The tax forms allow a further adjustment of "net farm income" for credits from previous losses, tax averaging, capital gains, and similar reductions. RT Vol. 203 at 46-47. Studies in the literature indicated that these adjustments could achieve tax savings ranging from 39 percent to 75 percent. Kan. Exh. 908; RT Vol. 203 at 35-36. Professor Whittlesey used the lower figure of 39 percent to adjust the net farm income data in the Kansas Farm Management Association reports to produce what he termed "taxable farm income." *Id.* at 37. Adjusted in this manner, the Kansas Farm Management Association data supports the taxable income levels and marginal tax rates used by

Professor Whittlesey. Kan. Exhs. 1076, 1077; RT Vol. 203 at 36-40; 61-64.

1. *Conclusion.*

I find that the taxable income levels and marginal tax rates used by Kansas are reasonable, and should be employed in calculating the offset against Kansas' damages for federal income taxes.

B. Kansas State Income Taxes.

The Kansas evidence on state income taxes mirrors the testimony on federal rates, except that these calculations became an element of Kansas' damages, rather than an offset thereto. Marginal statutory state rates were used, adjusted for 15 percent, consistent with the procedure for federal taxes. Kan. Exh. 892, Section A at 26; Kan. Exh. 1092, Table A11.

1. *Conclusion.*

I find that the results of the Kansas analysis are supported by the evidence and constitute an appropriate element of damages suffered by Kansas.

SECTION X

SOCIAL SECURITY TAXES

The Kansas damage claim also implicates social security taxes. The role of these taxes in the Kansas analysis is quite different, however, from the Kansas treatment of income taxes. While federal income taxes are deducted from net farm income that would have been realized without depletions, and hence reduce Kansas' damages, the Kansas testimony on social security taxes acts to increase its damage claim.

At the heart of the Kansas analysis of social security taxes is the notion that this program results in a net benefit to participating individuals, and their payments into the program should not be considered like other taxes. Professor Whittlesey concluded that the net present value of future social security benefits would be greater than the social security taxes that would have been paid if there had been no additional pumping to replace depletions. RT 183 at 132. In essence, he established a negative social security net marginal tax rate which was then deducted from and reduced the federal marginal income tax rate. *Id.* at 132-33. The impact of this social security offset against federal income taxes is to increase the Kansas damage claim. RT 180 at 131. Professor Whittlesey concluded that increased pumping expenses reduced net farm income, which in turn reduced contributions into the social security program. As a result, farmers lost social security benefits that they would have been able to achieve absent the depletions. RT Vol. 181 at 20-21. These lost future social security benefits, he said, must be treated the same as other forms of lost farm income. Kan.

Exh. 892, Section A at 25. Professor Whittlesey prepared Kan. Exhs. 1076 and 1077 to show that in all years there were some farmers "who would have benefited from additional income that would contribute to social security taxes." RT Vol. 203 at 84.

There is no question about the fact that the professional journals relied upon by Professor Whittlesey support the view that for many workers, over many periods of time, the benefits of the social security program outweighed the taxes they paid. Kan. Exh. 893 at 254, 259. Moreover, there is a "progressive benefit formula" which relates benefits to the earnings on which the tax is paid. *Id.* at 256. One writer concludes that there is "an unambiguous relation between an additional dollar of payroll tax paid and the incremental amount of future benefits." Kan. Exh. 901 at 3; see also Kan. Exhs. 897, 902. However, even the body of literature relied upon by Professor Whittlesey recognizes that the benefit-tax ratio has changed over time[25] and that individual benefits vary greatly with age, sex and marital status. Kan. Exhs. 893, 901; see also RT Vol. 183 at 126.

Professor Whittlesey recognized these variables, but as an economist, and in order to be "consistent," he believed that he had to consider social security taxes and account for net benefits. RT Vol. 180 at 113, 131-34. The results of his calculations are shown in Kan. Exh. 892, Table A11, as revised in Kan. Exh. 1092, Table A11. This table establishes net social security benefits for every year

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[25] Amendments to the Social Security Act in 1977 and 1983 both increased the tax rate and reduced benefits. Kan. Exh. 893 at 259-60, 263; Kan. Exh. 902 at 20.

from 1955 when the program began through 1996. Net benefits were highest in 1965 at 10.08 percent and declined gradually to 1.07 percent in 1996. These percentages were offset against marginal federal income tax rates. As a result, for example, the marginal income tax rate dropped from 16.89 percent to 8.81 percent in 1955. There were reductions in each of the following years, but they gradually become less. In 1996 the marginal income tax rate was reduced only from 22.25 percent to 21.18 percent. The result of these annual reductions was to increase the damages to Kansas over what they would have been if social security taxes had been ignored. RT Vol. 180 at 131.

Professor Whittlesey's approach was based upon certain acknowledged assumptions. Since the program was voluntary between 1955 and 1965, he assumed that 50 percent of those eligible in 1955 would elect to participate and would pay taxes into the program. He then increased participation and the taxes paid by 10 percent each year until 1965 when such taxes were mandatory. RT Vol. 180 at 103-04, 133. He acknowledged that the 50 percent assumption was a "judgment call," but he believed that people would have wanted to participate because of the very significant benefits that were available, particularly in the early years of the program. RT Vol. 180 at 108; RT Vol. 205 at 41-42.

The second major assumption was that net benefits were calculated for a married man, at age 50, drawing social security benefits at age 65 and earning less than the maximum taxable earnings subject to social security taxes. RT Vol. 180 at 145; RT Vol. 183 at 126. These assumptions were maintained throughout the study

period of 1955-96. Kan. Exh. 892, Section A at 24. No specific data were offered in support of the 50-year age, but Professor Whittlesey said that he had reviewed census data and that the average age of farmers would be very close to 50. RT Vol. 183 at 128. That assumption, however, is critical. One of the journals relied upon by Professor Whittlesey states that for workers aged 65 in 1982, "benefits earned outweighed taxes," but for all workers born after WWII the system would "operate as a tax throughout life." Kan. Exh. 893 at 259, 263.

Also implicit in the Kansas analysis are assumptions on the statutory payroll tax for an individual and his marginal personal income tax bracket. RT Vol. 181 at 7. Above certain and changing net income levels, no social security tax is due. To the extent that farmers earned in excess of the maximum taxable income, a reduction in net income would have had no impact on the amount of social security taxes paid. RT Vol. 195 at 90. Professor Whittlesey assumed that farmers had not already paid a maximum tax. In his judgment, "very few farmers, if any, would have been over the maximum throughout this period." RT Vol. 183 at 111. Kansas introduced Exhibits 1076 and 1077 in support of Professor Whittlesey's testimony. However, these exhibits also show that the top 25 percent of taxable farm income was consistently over the maximum social security limit from 1964 through 1981, and sometimes thereafter. Moreover, the data shown in Exhibits 1076 and 1077 were taken from Southwest Kansas Farm Management Association reports, which cover an area much larger than the ditch service area, and are not necessarily representative thereof. RT Vol. 205 at 86-87, 90-91, 95. Indeed, for 1973 as an example, average

net farm income in Finney County (which has the highest amount of irrigated acreage) was $89,852 compared to $72,000 for the larger southwest area. Colorado evidence also shows that stream depletions causing a reduction in net income in many years would not have had any impact on social security taxes paid. Colo. Exhs. 1150 A, B & C. These exhibits show that some farmers had net losses, and thus would have made no social security payments.

Professor Whittlesey relied upon a 1983 journal article authored by Roger H. Gordon for the actual computation of net social security benefits. Kan. Exh. 902. The Gordon article calculated a net social security tax rate at four ages, that is, 45, 55, 62 and 65, for individuals born in 1910, 1920 and 1940. Kan. Exh. 902 at 18-19. It was necessary then for Professor Whittlesey to make a series of extremely complex adjustments in order to adapt the data on net social security benefits to the ditch service area for the time period involved in this case, and for the assumptions which he made. Even Professor Whittlesey acknowledged that "the method that we have to follow to get there looks obtuse or somewhat cloudy." RT Vol. 181 at 19. An example of the steps required and the mathematics of the adjustments are shown in Kan. Exh. 918. These adjustments lend but one more level of uncertainty to the Kansas analysis. Colorado further points out that self-employment social security taxes include payments for disability and health insurance, and benefits for these purposes do not vary with the amount of money paid into the program over time. RT Vol. 195 at 95. Payments for disability and health insurance are shown on Colo. Exh. 1149.

The Colorado expert, Professor Wichelns, seemed to concur that net social security benefits, if shown, should be deducted from federal income tax. RT Vol. 195 at 91-92. However, he believed that the facts do not show the necessary linkage between reductions in net income and reductions in benefits from social security. *Id.* at 93. In his view, there is "very little information regarding the actual role of social security taxes or benefits among farmers in the ditch service areas." RT Vol. 210 at 20. He acknowledged that in the early years, certain individuals earned net income benefits from the social security taxes paid. But he also pointed out that the program changed over time, and in later years, "it's not clear that social security would provide benefits over the long haul." RT Vol. 195 at 90. For some, social security taxes "are indeed a tax and not a net benefit." *Id.* at 93. In his view, it was "more sensible" not to consider either social security taxes or net benefits therefrom in the estimation of Kansas' damages. *Id.* at 93; RT Vol. 210 at 19.

Professor Whittlesey approached the issue of social security taxes as an economist using what he believed to be the most professional methods. However, foregone social security benefits become a distinct element of Kansas' damages, and as such, must meet legal requirements. I find that these benefits are too speculative, and involve too many assumptions that may not be generally applicable, to meet the legal standards for damages. Restatement (Second) of Contracts, § 352 (1981); McCormick on Damages, § 26 at 100 (1935); *Knapp Shoes, Inc. v. Sylvania Shoe Mfg. Corp.*, 72 F.3d 190, 204 (1st Cir. 1995); *San Carlos Irrigation and Drainage Dist. v. United States*, 111 F.3d 1557, 1563 (Fed.Cir. 1997).

A. Conclusion.

Social security benefits should not be used to offset and reduce the marginal income tax rates used by Kansas.

SECTION XI

THE TIME VALUE OF MONEY – PREJUDGMENT INTEREST

A line in the case, *Matter of Oil Spill By the Amoco Cadiz*, 954 F.2d 1279 (7th Cir. 1992), immediately caught my eye: "Because the accident occurred so long ago, the largest issue in the case is prejudgment interest." 954 F.2d at 1330. That is the key issue here, although to the Kansas economists, the subject is all about the ancient principle of the "time value of money," on which there should be no issue at all. On the other hand, to the Colorado experts, the issue is a matter of "prejudgment interest," to be governed by legal constraints, not by economic principles. But whatever the terminology, the concepts, or the applicable rules, the questions here involved take us some distance beyond the cases that have previously considered the issues.

The total Kansas damage claim for shortages over the period from 1950 to 1994, brought to a 1998 value, is $62,369,173. Kan. Exh. 1092, Table D7. This total is broken down as follows: $9,218,305 for direct and indirect losses, in actual dollars when the damages occurred (except for future losses). These damages are comprised of the additional costs of pumping within the ditch service areas to replace surface water depletions; increased regional pumping costs, both historic and for the future period 1998-2048 (future costs were discounted back to a 1998 value); crop production losses on surface water only lands; and secondary impacts to the Kansas economy. The remaining portion of the total claim, namely, $53,150,867

out of $62,369,173, represents what the Kansas economists refer to as the time value of money. This economic concept includes both inflation and compensation for the loss of use of funds, and is reflected in a single "interest rate." Here, the total claim of $62,369,173 is composed of $21,386,697, which is the $9,218,305 loss figure adjusted for inflation, and $40,982,476 which represents lost investment opportunities. Thus, prejudgment interest, as the term has been used by Kansas in this case, includes an adjustment of the historic losses for inflation, as well as a rate of interest which might have been earned on funds wrongfully lost.[26] Applying well accepted economic principles governing the time value of money, the Kansas economic experts brought both past and future damages to a present value, i.e., 1998.

Colorado's experts put Kansas' damages at $4,742,071 in "nominal dollars," that is, the actual dollars at the time of the loss, except for future pumping costs which were discounted to a present value. Colo. Closing Br. at 13-14, Table 3. Adjusted for inflation only, using the CPI, the total becomes $9,047,075. Colorado letter dated 3/2/2000. Colorado offered no evidence on prejudgment interest, except as inflation is included as part of a prejudgment interest rate. RT Vol. 199 at 21. Colorado states "that a fair and equitable remedy is simply to adjust the damages awarded for inflation." Colo. Closing Br. at 110.

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[26] It is easy to become confused on this point because in lay parlance "inflation" and "interest" are separate concepts. Moreover, while Colorado has generally opposed "prejudgment interest," it has acknowledged the need to adjust Kansas losses for inflation.

Recent cases hold, however, that adjusting for inflation is not a full substitute for prejudgment interest. A consumer price index adjustment "simply ensures that inflation does not erode the value of money"; it does not "compensate for the lost use of the money in the intervening time." *United States v. City of Warren, Mich.*, 138 F.3d 1083, 1096 (6th Cir. 1998). See also *Chandler v. Bombardier Capital, Inc.*, 44 F.3d 80, 84 (2d Cir. 1994); *Clinchfield Coal Co. v. Federal Mine Safety and Health Review Commission*, 895 F.2d 773, 780 (D.C.Cir. 1990).

A. Kansas' Expert Economic Opinions.

In addition to Professor Whittlesey, three economic experts[27] testified for Kansas on the subject of prejudgment interest, including the specific interest rates used to

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[27] These expert witnesses were Professor Peter Barry, whose qualifications are described in Section VI, Professor William F. Sharpe, and Dr. Gary L. Benjamin.

Professor Sharpe is a long-time professor, now emeritus, in the Graduate School of Business at Stanford University, and a preeminent advisor to the United States investment industry. He has served as a consultant for pension funds totaling more than 200 billion dollars (for the California Public Employees Retirement System, AT&T, and Hewlett Packard), and is an advisor to Wells Fargo, Merrill Lynch, UPS, and the Union Bank of Switzerland. RT Vol. 190 at 32-33. He is the author of six books, and innumerable articles in professional journals. He is past president of the American Finance Association. In 1990, he received the Nobel Prize in Economic Sciences. Kan. Exh. 981.

Dr. Benjamin is a retired official of the Federal Reserve Bank of Chicago who worked with agriculture in that system for a period of some 28 years. He was responsible for the Bank's popular "AgLetter." Kan. Exh. 980.

compound past damages (including an adjustment for inflation) and to discount those occurring in the future. While economists speak in terms of the time value of money, it was recognized that compounding historic losses and costs to a current value is the same in a legal sense as adding prejudgment interest. RT Vol. 183 at 74. As a general economic principle, Colorado stated that there was no dispute about the time value of money. RT Vol. 178 at 30; RT Vol. 199 at 18-21.

Professor Sharpe, who was awarded the Nobel Prize in Economics in 1990, pointed out that the time value of money is an ancient principle, going back to loans of seeds and animals. RT Vol. 190 at 52, 61. Today, it is a "fundamental principle of economics," affecting every aspect of our lives. It holds that:

> " . . . it is essential to recognize the effect of time, either past or future, when determining the value of any asset or liability. Thus, in economic transactions, an amount owed in the past cannot be paid off today by paying the same nominal value that would have been owed had it been paid in the past. Rather, the past nominal amount must be increased to a higher present nominal amount in order to account for the earning power of the original value during the time that has passed. Likewise, an amount owing in the future must be discounted to a lower present value in order to account for the future earning power of the value in question over the future period." Kan. Exh. 982 at 1.

Professor Sharpe testified that by compounding past values to the present, and discounting future values to the present, financial values are put on a common

ground. *Id.* The interest rate used to bring a past obligation to present value includes three components. He testified that the first is compensation for price level changes, or inflation. The interest rate must be at least as high as the rate of inflation, or one would have less purchasing power than was present at the beginning. RT Vol. 190 at 45. The second component represents the preference to have purchasing power now, rather than later. *Id.* at 46. Sometimes this element is described as "opportunity cost," representing the opportunity to invest and earn from such funds. RT Vol. 189 at 29-30. The last element, if risk is involved, would be an additional amount of interest to compensate for that risk. RT Vol. 190 at 46. In Professor Sharpe's opinion, to be consistent with fundamental economic principles and financial practices, damages arising from violation of the compact must be converted to present values using appropriate rates of interest. Kan. Exh. 982 at 3.

The specific rates of interest used to compound historic damages were carefully developed by Professor Whittlesey and Professor Barry. RT Vol. 189 at 39-54. These are found in Kan. Exh. 1092, Table A12 at 17, and reflect varying rates depending upon inflation and market conditions in the years since 1850. Colorado's expert, Professor Wichelns, did not present any opinion as to what the appropriate interest rates should be if one were to account fully for the time value of money, that is, for both inflation and lost investment opportunities. RT Vol. 199 at 21.

Kansas' experts concluded that Colorado would enjoy a windfall if the principle of time value of money were not applied to past losses. Kan. Exh. 979 at 2; Kan.

Exh. 982 at 3; RT Vol. 189 at 105-06. Conversely, applying prejudgment interest is not "punitive"; it is merely "taking that which is gained by one party and lost by the other and restoring things to the point of equality." RT Vol. 203 at 96-97.

B. Colorado's Position on Prejudgment Interest.

To begin with, in earlier briefs on certain damage issues, Colorado took the position that Kansas' damages were unliquidated, and that prejudgment interest could not be awarded as a matter of law on an unliquidated claim. That argument was dealt with in my Second Report filed in September 1997. The Second Report recommended: "That the unliquidated nature of Kansas' claim for damages does not bar the award of prejudgment interest, whether the remedy includes money damages or water repayment." Second Report at 113-114. Colorado filed an Exception to this recommendation. The Court overruled the Exception, but without prejudice to Colorado's right to renew the Exception at the conclusion of these remedial proceedings. 522 U.S. 1073 (1998). The section of my Second Report dealing with this issue is now included as Exhibit 4 in the Appendix. I still remain of the same opinion, and make the same recommendation, namely that prejudgment interest is not barred as a matter of law.

Apart from Colorado's Exception, and speaking strictly as an economist, Professor Wichelns testified that, "we need to adjust past values to account for inflation." RT Vol. 199 at 19. However, he saw the issue of compounding interest for past losses or past damages as a

"policy issue," and offered no opinion. *Id.* He recognized that adjusting for changes in the purchasing power of the dollar over time is not the same as prejudgment interest. RT Vol. 199 at 21. He also acknowledged that one aspect of the time value of money principle requires discounting future accounts owed if they are going to be settled in the present. *Id.* at 24. This, he agreed, as an economic matter, is essentially the same principle as compounding past amounts owed. *Id.* It should be noted that Colorado did discount the future costs of additional pumping caused by depletions, although it contests compounding the additional historic costs.

Colorado argues that prejudgment interest, apart from an adjustment for inflation, should be denied for a number of reasons. First, Colorado points out that neither state was aware for many years that postcompact well pumping in Colorado was depleting usable Stateline flows in violation of the compact.[28] Second, there is no statute of limitations applicable to a compact breach which could serve to limit the amounts due, or to assure the use of more recent and better data from which to determine damages. Third, Colorado states that farmers in Kansas during this period were themselves drilling wells, and those who did not, could have, at least until 1978. Fourth, to the extent that damages are based upon increased costs of pumping groundwater or crop production losses, the damages will not be paid to those water

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[28] Colorado states that this was not known until at least 1984. I believe that the impact of postcompact well pumping in Colorado was known, or should have been known, before that time.

users, but to the State of Kansas. In the absence of a knowing or intentional breach of the compact, Colorado argues that the State of Kansas should not be allowed to recover all of the losses, and prejudgment interest, at rates incurred by the water users. Finally, if prejudgment interest is to be awarded, the interest rate to be used "requires careful thought." Colo. Closing Br. at 110. Kansas experts used interest rates which reflected inflation and the opportunity costs to farmers to compound the losses attributed to farmers. *Id.*; Kan. Exh. 892, Section A at 28-29, Table 12. Colorado argues that the rate of interest applicable to the State of Kansas, which is lower, should have been used instead.

C. Legal Principles Governing an Award of Prejudgment Interest.

The award of prejudgment interest is not unique. As I concluded in my Second Report, a majority of jurisdictions now reject the traditional approach which allowed prejudgment interest only under statute or on a liquidated claim. Second Report at 106-07. A recent case states that prejudgment interest is now the "norm in federal litigation"; it is an "ordinary part of any award under federal law." *Matter of Oil Spill by the Amoco Cadiz*, 954 F.2d 1279, 1331-32 (7th Cir. 1992), citing *West Virginia v. United States*, 479 U.S. 305, 310, 93 L.Ed.2d 639, 107 S.Ct. 702, 706 (1987); see also *General Motors Corp. v. Devex Corp.*, 461 U.S. 648, 655-56, 76 L.Ed.2d 211, 103 S.Ct. 2058, 2062-63 (1983); *Barbour v. Merrill*, 48 F.3d 1270, 1278-79 (D.C. Cir. 1995); *Lorenzen v. Employees Retirement Plan of Sperry & Hutchinson Co.*, 896 F.2d 228, 236 (7th Cir. 1990); *Gorenstein Enterprises, Inc. v. Quality Care-USA, Inc.*, 874 F.2d 431, 436-37 (7th Cir. 1989).

A recent patent case states:

> " . . . neither pre- nor postjudgment interest awards are unique to patent law. Many other areas of law besides patent law, including contract, tort, insurance, admiralty, employment, securities, and civil rights, also provide for prejudgment interest awards under both statutory and common-law authority." *Transmatic, Inc. v. Gulton Industries, Inc.*, 180 F.3d 1343, 1347 (Fed.Cir. 1999).

In a footnote the Court then provides the following citations: 15 U.S.C. §§ 15(a), 15a (1994) (antitrust); 17 C.F.R. § 201.600 (1994), *reprinted in* 15 U.S.C. foll. § 78u (securities); 29 U.S.C. § 1132(a)(9) (1994) (ERISA); *City of Milwaukee v. Cement Div. Nat'l Gypsum Co.*, 515 U.S. 189, 132 L.Ed.2d 148, 115 S.Ct. 2091 (1995) (admiralty); *United States v. Texas*, 507 U.S. 529, 123 L.Ed.2d 245, 113 S.Ct. 1631 (1993) (contract); *Milwaukee Brewery Workers' Pension Plan v. Jos. Schlitz Brewing Co.*, 513 U.S. 414, 130 L.Ed.2d 932, 115 S.Ct. 981 (1995) (ERISA); *Loeffler v. Frank*, 486 U.S. 549, 100 L.Ed.2d 549, 108 S.Ct. 1965 (1988) (Title VII); *Morales v. Freund*, 163 F.3d 763 (2nd Cir. 1999) (securities); *Gierlinger v. Gleason*, 160 F.3d 858 (2nd Cir. 1998) (§ 1983); *United States v. Township of Brighton*, 153 F.3d 307 (6th Cir. 1998) (CERCLA); *Cimino v. Raymark Indus., Inc.*, 151 F.3d 297 (5th Cir. 1998) (tort); *Fratus v. Republic W. Ins. Co.*, 147 F.3d 25 (1st Cir. 1998) (insurance).

Also there is now ample authority that prejudgment interest is not an added remedy, but simply is part of providing full compensation to the injured party. *West*

Virginia v. United States, 479 U.S. 305, 310 n. 2, 93 L.Ed.2d 639, 107 S.Ct. 702 (1987) ("Prejudgment interest serves to compensate for the loss of use of money due as damages from the time the claim accrues until judgment is entered, thereby achieving full compensation for the injury those damages are intended to redress."); *Transmatic, Inc. v. Gulton Industries, Inc.*, 180 F.3d 1343 (Fed. Cir. 1999), citing *West Virginia v. United States; United States v. City of Warren, Mich.*, 138 F.3d 1083, 1096 (6th Cir. 1998) ("An award of prejudgment interest 'is an element of complete compensation' in a Title VII back pay award," citing cases); *Chandler v. Bombardier Capital, Inc.*, 44 F.3d 80, 83 (2nd Cir. 1994) ("The purpose of a prejudgment interest award in a wrongful termination case is to compensate a plaintiff for the loss of use of money that the plaintiff otherwise would have earned had he not been unjustly discharged," citing cases); *Matter of Oil Spill by the Amoco Cadiz*, 954 F.2d 1279, 1331 (7th Cir. 1992) ("Prejudgment interest is an element of complete compensation," citing *West Virginia v. U.S.* and other cases); *Northern Natural Gas Co. v. Grounds*, 393 F.Supp. 949, 991 (1974) ("The object of this phase of the litigation is to assure that just compensation be paid . . . [and] an award of prejudgment interest is required in order to assure this result.")

Prejudgment interest, as a legal matter, is intended to compensate injured parties both for the time value of the lost money as well as for the effects of inflation. *United States v. City of Warren, Mich.*, 138 F.3d 1083 (6th Cir. 1998). "Money today is not a full substitute for the same sum that should have been paid years ago." *Matter of Oil Spill by the Amoco Cadiz*, 954 F.2d 1279, 1331 (7th Cir. 1992). "Prejudgment interest, like all monetary interest, is

simply compensation for the use or forbearance of money owed." *Transmatic, Inc. v. Gulton Industries, Inc.*, 180 F.3d 1343, 1347 (Fed. Cir. 1999). "Prejudgment interest is not awarded as a penalty; it is merely an element of just compensation." *City of Milwaukee v. Cement Division, National Gypsum, Co.*, 515 U.S. 189, 197, 132 L.Ed.2d 148, 115 S.Ct. 2091 (1995).

However, prejudgment interest lies within the sound discretion of the Court. It is not to be awarded according to any rigid theory of compensation for money withheld, "but is given in response to considerations of fairness." *Jackson County v. United States*, 308 U.S. 343, 352, 84 L.Ed. 313, 60 S.Ct. 285 (1939); *United States v. City of Warren, Mich.*, 138 F.3d 1083 (6th Cir. 1998); *Matter of Oil Spill by the Amoco Cadiz*, 954 F.2d 1279, 1334 (7th Cir. 1992). There is also authority that a *denial* of prejudgment interest may be unfair, and should be justified. *City of Milwaukee v. Cement Division, National Gypsum Co.*, 515 U.S. 189, 132 L.Ed.2d 148, 115 S.Ct. 2091 (1995); *Matter of Oil Spill by the Amoco Cadiz*, 954 F.2d 1279, 1334 (7th Cir. 1992). Prejudgment interest was denied on grounds of fairness in *Jackson County v. United States*, 308 U.S. 343, 84 L.Ed. 313, 60 S.Ct. 285 (1939); *Nedd v. United Mine Workers of America*, 488 F.Supp. 1208 (1980) ("Justice requires the disallowance of interest.")

D. Considerations in this Case Affecting Prejudgment Interest.

Kansas can argue persuasively, and has done so, that the law strongly supports the inclusion of prejudgment interest as part of a damage award. Likewise, there is no

doubt that fundamental economic principles require the same result. Yet there is no case in which prejudgment interest has been awarded that is at all similar to the facts in this dispute. Indeed, even damages as a potential remedy for the violation of an interstate water compact were not recognized until 1987 in *Texas v. New Mexico*, 482 U.S. 124, 96 L.Ed.2d 105, 107 S.Ct. 2279 (1987). When Kansas filed its complaint, it sought only a decree commanding Colorado "to deliver the waters of the Arkansas River in accordance with the provisions of the Arkansas River Compact." Not until the *Texas v. New Mexico* decision was the Kansas complaint amended to include a claim for damages.

Nonetheless, looking to the law generally and apart from interstate water disputes, the cases favor the inclusion of prejudgment interest as a component of damages, unless circumstances justify otherwise. Some cases specifically articulate a presumption in favor of such inclusion. *Barbour v. Merrill*, 48 F.3d 1270, 1279 (D.C. Cir. 1995); *Gorenstein Enterprises, Inc. v. Quality Care-USA, Inc.*, 874 F.2d 431, 436 (7th Cir. 1989); *Waterside Ocean Navigation Co. v. International Navigation Ltd.*, 737 F.2d 150, 154 (2nd Cir. 1984). Prior to *City of Milwaukee v. Cement Division, National Gypsum Co.*, 515 U.S. 189, 132 L.Ed.2d 148, 115 S.Ct. 2091 (1995), the courts had developed several criteria for the exercise of their discretion if such interest were to be denied: whether laches was present; whether there was a genuine dispute over a good faith claim in a mutual fault situation; whether the plaintiff had been less than diligent in prosecuting the action, or guilty of improper delaying tactics; whether the defendant had been unjustly enriched; whether prejudgment interest

would be compensatory rather than punitive. *Reeled Tubing, Inc. v. M/V Chad G*, 794 F.2d 1026, 1028 (5th Cir. 1986); *Segal v. Gilbert Color Systems, Inc.*, 746 F.2d 78, 82-83 (1st Cir. 1984); *Noritake Co., Inc. v. M/V Hellenic Champion*, 627 F.2d 724, 728-29 n. 3 (5th Cir. 1980); *Nedd v. United Mine Workers of America*, 488 F.Supp. 1208, 1219-20 (M.D. Pa. 1980).

Milwaukee, however, dismissed the argument of a good faith dispute as having "little weight," and stated that the Court was "unmoved" by the magnitude of the plaintiff's fault in a comparative negligence situation. 515 U.S. at 197, 199. Apart from the issue of delay, the courts actually have "done little to sketch the limits of acceptable discretion" in denying prejudgment interest. *Matter of Oil Spill by the Amoco Cadiz*, 954 F.2d 1279, 1334 (7th Cir. 1992). Yet, one fundamental standard still appears to remain – that prejudgment interest is given "in response to considerations of fairness." *Jackson County v. United States*, 308 U.S. 343, 352, 84 L.Ed. 313, 60 S.Ct. 285 (1939). Likewise, the remedy in this case, taken as a whole, must be a "fair and equitable solution." *Texas v. New Mexico*, 482 U.S. 124, 134, 96 L.Ed.2d 105, 107 S.Ct. 2279 (1987).

The obvious difference between the many reported cases on prejudgment interest, and the facts at hand, is the great length of time between the first depletions of usable Stateline flow and a judgment. At least 50 years will be involved. Two cases have been found with a lag of 20 to 30 years between injury on some claims and judgment, but no longer period of time. *Wilkerson v. Ingalls Shipbuilding, Inc.*, 125 F.3d 904 (5th Cir. 1997); *Nedd v. United Mine Workers of America*, 488 F.Supp. 1208 (1980). And in each of these cases, although for reasons other

than the delay, interest was actually denied. Normally, either a statute of limitations or the application of laches would preclude a large buildup of prejudgment interest. That is not to say, however, that such interest cannot be large and exceed the basic claim. In the *Matter of Oil Spill by the Amoco Cadiz*, the Court upheld prejudgment interest of more than $120 million, accrued over 13 years, on a damage award of $61 million. 954 F.2d at 1330, 1335. And in *City of Milwaukee*, damages were $1.67 million, and prejudgment interest amounted to $5.3 million. 515 U.S. at 192. However, because prejudgment interest is an element of "full compensation," an award of such interest "no matter how large, cannot be called 'punitive.' " *Matter of Milwaukee Cheese Wisconsin, Inc.*, 112 F.3d 845, 849 (7th Cir. 1997).

Nonetheless, without some limitation, compounding even small damages over 50 years produces startling results. For example, the Kansas evidence shows additional pumping costs within the ditch service areas in 1950 amounting to only $103. Compounded to 1998, these damages become $4166. Kan. Exh. 1092, Table A18. Likewise, crop losses in 1950 amounted to only $2060 according to Kansas' evidence, but compensation sought for these losses is $83,594. Kan. Exh. 1092, Table C10. The H-I model has computed depletions in usable flow for 1950, and each year after, and Kansas turns those shortages into damages. Yet I am confident that in 1950, the first year after the compact was signed, and in the early years thereafter, no one had any thought that the compact was being violated. It was lawful in Colorado to drill wells without state permission, and Colorado farmers saw the

same kind of well development going on along the Arkansas River in Kansas.

In many of the prejudgment interest cases, the defendant has the money in hand, either wrongfully withheld or wrongfully collected from the plaintiff, and thus has the use of the money until final judgment. Prejudgment interest prevents such a defendant from profiting from the wrong. *Gore, Inc. v. Glickman*, 137 F.3d 863 (5th Cir. 1998); *Matter of Oil Spill by the Amoco Cadiz*, 954 F.2d 1279 (7th Cir. 1992). The situation here is different. The benefits of the usable flows withheld went primarily to Colorado farmers, not to the State of Colorado. Likewise, except for taxes lost to the State of Kansas and the secondary impacts to the Kansas economy, both of which are relatively small, the additional costs and crop losses were suffered by Kansas farmers, yet damages go to the state. Prejudgment interest here neither takes from those who benefitted, nor goes to those who were injured. Kansas, of course, does not see this as a meaningful distinction. For 50 years, it argues, Colorado has had the advantage of water belonging to Kansas, and should not now be allowed to gain from compact violations. That there have been gains, both to Colorado farmers and to the State of Colorado, is not in doubt. Surely that is why Colorado opposed the legal position taken by Kansas, namely, that damages be determined on the basis of gains in Colorado rather than injury to Kansas. I ruled against Kansas on this issue (see Exhibit 1 in the Appendix) but we should not be oblivious to Colorado's use of the water over this long period of years.

An interstate water compact, besides being federal law, is a contract. *Texas v. New Mexico*, 462 U.S. 554, 564,

77 L.Ed.2d 1, 103 S.Ct. 2558 (1983). Though a compact deals in water rather than money, many of the same policies calling for prejudgment interest in general contract situations also apply to interstate water disputes. The upstream state has a natural geographic advantage. It has first access to the water. It can take what it wants, leaving the downstream state to complain if the upstream use exceeds its compact share. An enforcement action by the downstream state is not only difficult and expensive, it almost always requires years to complete. Generally, a preliminary injunction is not available, and the upstream state continues to have use of water during the long trial. In many situations, the problem begins with the compact itself, which may be quite vague. The Arkansas River Compact, for example, does not allocate to Kansas either a defined quantity of water or a specific share of river flow. Rather, it calls for an "equitable" division, and only places restrictions on new Colorado water development that will cause material depletions of usable flows into Kansas. The problems of data collection are also enormous. In this case, new wells were the principal cause of the Stateline depletions. But, initially, there were no records of the number of wells, where they were located, or how much water they pumped. All of these data, and much more, had to be developed before specific determinations of well impacts could be made.

I am convinced, in general, that prejudgment interest adjusting for inflation and for the loss of use of funds owed should be included in any damage award for violation of an interstate water compact. I have difficulty, however, in recommending the full amount sought by Kansas in this case. Given the long delay here, and the

dramatic impact of compounding over so many years, fairness would seem to deny at least a portion of prejudgment interest during the early years when neither state understood that depletions were occurring. Colorado contends that it was not aware of a compact violation until at least 1984. Colo. Closing Br. at 107. I disagree. I find that by 1968 Colorado knew, or should have known, that postcompact wells were causing material depletions of usable Stateline flows. It is essentially correct that Kansas did not register a formal complaint until 1985, but that is not to say that Colorado was unaware of the impact of its postcompact pumping until that time.

Prior to 1965 Colorado had no system for the regulation of groundwater water. While surface diversions had required state permits since the 1800s, and were closely regulated on a "first in time, first in right" basis, wells could be drilled without state permission and even without the state's knowledge. Nor were any reports required of the amounts pumped. Colorado's evidence showed that some 1233 new large irrigation wells were drilled along the Arkansas River between 1949 and 1965. Colo. Exh. 165*, Table A1. Colorado's database constructed for the trial estimated that pumping in 1950 amounted to 41,458 acre-feet, and had increased to 203,925 acre-feet in 1964. *Id.*

The pressure to regulate groundwater pumping came first, not from Kansas, but from holders of downstream surface diversion rights in Colorado, and resulted in 1965 state legislation. Under this new legislation, the State Engineer was ordered to administer wells along the Arkansas River in accordance with the doctrine of prior appropriation, that is, to subordinate new wells to prior

surface diversion rights. Colo. Exh. 378. The State Engineer's first effort to enforce the new law, however, was struck down by the Colorado Supreme Court. *Fellhauer v. People*, 167 Colo. 320, 447 P.2d 986 (1968). Further legislation then resulted in a comprehensive study of both surface diversions and groundwater pumping along the Arkansas River, known as the 1968 Wheeler Report. Jt. Exh. 92. This Report, which was published at the direction of the state legislature, found that well use in recent years had "materially decreased the surface flows available to direct flow and storage rights." *Id.* at vi. The Wheeler Report and more state legislation led finally to new rules limiting pumping to three days a week, without mitigation measures to protect prior rights. Jt. Exh. 93. While these Colorado efforts were aimed at protecting downstream surface diversions in Colorado from the impacts of new and excessive pumping, Colorado had to know that the impacts on the other side of the Stateline in Kansas were no different.

During the liability phase of the trial, Colorado sought to bar Kansas from any relief, claiming that the facts concerning well development in Colorado were common knowledge by the mid-1960s, and that Kansas was guilty of laches. That contention has a double edge. Colorado is in no position now to claim that it was unaware of the problems caused by unregulated pumping until at least 1984.

With regard to the issue of fairness, Kansas itself recently argued that Kansas gas producers should not be responsible for prejudgment interest on refunds of payments that were made in reliance upon a decision of the Federal Energy Regulatory Commission that was lawful

at the time. *Anadarko Petroleum Corp. v. FERC*, 196 F.3d 1264 (D.C.Cir. 1999). Federal law established maximum prices on certain natural gas sales, but allowed an excess charge to recover state severance taxes. FERC ruled that a Kansas ad valorem tax was such a severance tax, and accordingly allowed higher prices. However, this ruling was challenged in 1983, and in 1988 the Court held that the FERC rule "fell short of reasoned decision-making." *Colorado Interstate Gas Co. v. FERC*, 850 F.2d at 769, 770 (D.C. Cir. 1988). The case was remanded to allow the Commission to show what would be required for a tax to be similar to a production or severance tax. Five years passed before FERC acted on the remand, and then the Commission simply reversed its earlier decision, and ordered repayment of all excess charges after 1988, together with interest. Interest charges amounted to 160 percent of the principal.

Kansas sought to have all producers relieved of the interest charges because: "the litigation has gone on forever;" the Commission was responsible for much of the delay; and the producers had relied upon the Commission's settled view that the Kansas ad valorem tax was a severance tax. *Anadarko Petroleum Corp. v. FERC*, 196 F.3d at 1268. The Court of Appeal was not persuaded, stating that neither the Commission's legal errors nor its "snail-like pace" were grounds for changing the producers' interest obligations. *Id.* It was the customers, ruled the Court, who had paid more than they should, and who were entitled to be made whole. Quoting *Matter of Milwaukee Cheese Wisconsin, Inc.*, the Court said: "Compensation deferred is compensation reduced by the time value of money." *Id.* at 1267.

The general lack of knowledge in the early years about pumping in Colorado and its impacts along the Arkansas River served to protect Kansas during the liability phase of the case against a claim of laches. The same degree of fairness, I believe, should now relieve Colorado of the obligation to pay full interest rates on damages from depletions during 1950-68 period, which now only with hindsight and the benefit of sophisticated computer modeling can be found to have occurred.

Kansas argues that Colorado's awareness, or lack of awareness, of compact violations during the early years should have no bearing here. They contend that Colorado's knowledge would be a consideration only if prejudgment interest were part of a punitive damage award rather than an element of compensatory damages. As a policy issue, they also say that compact compliance is hardly encouraged if an upstream state is better off the less it knows. But Kansas fails to acknowledge that it too was involved. Neither state in the early years saw any wrongdoing, or thought that Kansas was not receiving its compact share of usable flows of the Arkansas River. Under these circumstances, it does not now seem fair to impose compound interest rates for that period of time.

There is, however, another consideration in the award of prejudgment interest during these early years. Three elements can be involved in any such award: an interest rate to reflect the loss of use of money owed; a rate to reflect inflation; and a risk factor, although that is not applicable here. Denial of "prejudgment interest" during the 1950-68 period would ordinarily mean that only "nominal" damages would be recovered, that is, only the actual dollar values at the time of the loss. But

here, Colorado itself states that a "fair and equitable remedy" would adjust all damages for inflation. Colo. Closing Br. at 110. Also, Colorado's chief expert Professor Wichelns, speaking as an economist, testified to the need to adjust past values to account for inflation. RT Vol. 199 at 19. Given the Colorado position, I thus recommend that actual damages for the period 1950-68 should be adjusted for inflation, but should not bear compound interest reflecting the loss of use of those monies.

E. Conclusion.

Kansas' damages, as determined in earlier Sections of this Report, should include prejudgment interest at rates proposed by Kansas, but only from 1969 to the date of judgment. These rates properly include inflation and the loss of use of money due as damages. Damages incurred during the 1950-68 period should be adjusted for inflation only using rates proposed by Kansas.

SECTION XII

REPAYMENT IN WATER

At the conclusion of the evidence on money damages, Colorado presented a proposal for repayment in water. This was included in an expert report (Colo. Exh. 1205) testified to by James Lochhead[29] and Dr. Leo M. Eisel.[30] On rebuttal, the Colorado State Engineer, Hal D. Simpson, also testified on the proposed remedy. While I have ruled that *Texas v. New Mexico* allows a suitable remedy in either money damages or in water, Colorado has long taken the position that repayment in water "would likely be a more equitable remedy in this case." Second Report at 72-73. Colorado's opening statement on this phase of the trial, however, foreshadowed a softening of this position. Counsel stated that the water repayment proposal originated in part over concerns that lowered water tables in the Ogallala aquifer would result in substantial damages that would be difficult to offset, and

---

[29] Mr. Lochhead is an attorney in private practice in Denver, Colorado, and participated in the preparation of Colo. Exh. 1205. Until recently, he served as the Executive Director of the Colorado Department of Natural Resources. He also served on the Colorado Water Conservation Board for fifteen years, and was Colorado's commissioner to the Upper Colorado River Commission for eleven years. His qualifications are shown in Colo. Exh. 1204*.

[30] Dr. Eisel is a consulting engineer with the well known firm of Brown & Caldwell, and is the former Director of the U.S. Water Resources Council. His qualifications appear in Colo. Exh. 1015*. Dr. Eisel was responsible for the engineering aspects of the proposal, particularly the investigation into the availability of water for repayment purposes, and the storage required.

that repayment in water, over time, would restore these water levels. RT Vol. 211 at 44. As it turned out, he stated, the Kansas claim for these damages "is in a relatively reasonable range." *Id.* Moreover, counsel stressed that Colorado did not want to insist upon a form of remedy "that will only engender years of additional controversy."[31] *Id.* at 50.

Mr. Simpson had the last word on Colorado's water remedy proposal, testifying after several Kansas experts had raised a number of concerns and objections. He confirmed his counsel's statement about the original reason for the proposal:

> "I would conclude by saying and emphasizing again that the reason we suggested repayment in water was our concern about the lowered water levels in the Ogallala aquifer and that the future pumping costs would be very significant. As we now know, those are not the situation." RT Vol. 214 at 69.

Then Mr. Simpson added:

> "And because of Mr. Pope's [Kansas Chief Engineer, Division of Water Resources] opinions, it would appear to me that repayment in water would be a difficult situation to undertake. It appears that they would resist many ways what we would propose to do. It would result in some expensive and time-consuming disputes.

---

[31] In his opening remarks, counsel for Kansas said that Kansas did in fact believe that the proposal would "engender years of controversy." RT Vol. 211 at 50-51.

> I think Colorado's position is we would like to end this litigation and not have it continue under a different format for another 15 years."

On cross-examination, Mr. Simpson seemed to distance Colorado even further from its water repayment proposal:

> "Q. Do I understand your testimony to be that, given the size of the Kansas claim for money damages as it now stands, that it may be appropriate to prefer that form of remedy over a water repayment remedy?
>
> A. I think, as I summarized, the potential for ongoing disputes, carrying the litigation forward under another format or under the review of a river master and the fact that the monetary damages from future pumping costs associated with the lowered water levels in the Ogallala aquifer are smaller than we thought, *repayment in water may not be as desirable as Colorado originally had thought and it may not, in fact, be the best way to go.*" RT Vol. 214, pp. 70-71, emphasis added.

Nonetheless, I believe that it is still appropriate to include a review of the Colorado proposal to repay in water.

A. The Colorado Proposal.

Colorado's proposal to repay past depletions of usable Stateline flows in water was developed and presented by Dr. James S. Lochhead and Dr. Leo Eisel. They looked at the feasibility of repaying approximately 430,000 acre-feet, in addition to any amounts of water required for current compliance. RT Vol. 211 at 114; RT

Vol. 212 at 27. Depletions for the period 1950-96 have been determined to be 428,005 acre-feet. Jt. Exh. 183. The proposal was to repay depletions over fifteen years at an average rate of approximately 30,000 acre-feet per year, based on a moving five year average. Colo. Exh. 1205 at 1. Annual deliveries could vary between 24,000 acre-feet and 40,000 acre-feet. *Id.* at 3. It would be necessary to acquire approxin tely 30,000 acre-feet of storage rights in John Martin Reservoir, to allow Colorado to take advantage of carrying over water available in wet years, and to allow Kansas to call for deliveries as needed. Although repayment was to be made over fifteen years, no additional water or "water interest" was to be made. RT Vol. 212 at 61, 79.

On average, 30,000 acre-feet annually was thought to be an amount of water that Kansas farmers could beneficially use. RT Vol. 211 at 118, 121-24. Colorado prepared a table for the years 1950 through 1994 showing that in almost all years the Kansas ditches were short of water, entirely apart from Stateline depletions caused by Colorado. Assuming no Stateline depletions, total ditch shortages still averaged 86,337 acre-feet annually over this period of time. Colo. Exh. 1205, Table 1. 30,000 acre-feet on average was also thought to be an amount of water which Colorado could acquire and pay for. RT Vol. 212 at 47. Colorado would stand the evaporative losses of water stored in John Martin Reservoir until it was "booked over" to the account of Kansas. RT Vol. 212 at 38. Transit losses between John Martin Reservoir and the Stateline would also be borne by Colorado. *Id.*

B. Contingencies Affecting Implementation of The Water Repayment Program.

Colorado witnesses acknowledge that a number of agreements and actions by others would be required in order to implement such a water repayment program. These include:

1. Acquisition of water from cities and farmers on an annual basis sufficient to meet program needs. The State of Colorado itself does not own water or water rights. RT Vol. 211 at 45-46; Colo. Exh. 1205 at 2.
2. State legislation to appropriate funds for the program, including the acquisition of water rights.
3. State legislation to establish a water bank; to authorize the State Engineer to adopt special rules for its administration; and to authorize the Colorado Water Conservation Board to operate the bank. RT Vol. 211 at 82-83.
4. State legislation authorizing the State Engineer to administer the temporary transfer of irrigation water and the fallowing of land for repayment to Kansas. Colo. Exh. 1205 at 2, 30; RT Vol. 211 at 84.
5. Agreement with the federal government to acquire storage rights in John Martin Reservoir. RT Vol. 212 at 48.
6. Agreements with other entities having storage rights in John Martin Reservoir. *Id.* at 48-49.
7. Agreement with the State of Kansas in regard to transferring water from Colorado's repayment account in John Martin Reservoir over to a Kansas account. RT Vol. 212 at 38.

8. Additional monitoring to ensure that lands irrigated by acquired shares or water rights are actually fallowed. Colo. Exh. 1205 at 3.
9. Amendment of some of the ditch company bylaws to permit the transfer of water out of their service areas. Colo. Exh. 1205 at 30; RT Vol. 211 at 83; RT Vol. 212 at 25.
10. Administration of the program so that no injury would be caused to the holders of other water rights. Colo. Exh. 1205 at 4; RT Vol. 212 at 50.
11. Some measure of cooperation from Kansas. RT Vol. 212 at 51-52. Kansas would have to "want to make this work." [Eisel] RT Vol. 212 at 51. The program has "political complexities" and "it clearly depends on, frankly, the attitude and participation of the State of Kansas." [Lochhead] RT Vol. 211 at 89-90.

Despite these contingencies and problems, however, it was the opinion of both Mr. Lochhead and Dr. Eisel that the water repayment program could be successfully implemented. RT Vol. 211 at 90; RT Vol. 212 at 47.

C. Availability of Repayment Water.

Dr. Eisel conducted a feasibility level investigation on the availability of water for the repayment program. He did not receive firm commitments from any source. Nor did he estimate what the cost of water acquisitions might be. Nonetheless, after his investigation, he concluded that sufficient water could be acquired, and at prices for which the Legislature would appropriate funds. RT Vol. 212 at 47. Mr. Lochhead held the same view. RT Vol. 211 at 90-92.

Colorado proposed first to acquire excess water from the cities of Pueblo, Colorado Springs, and Aurora. Pueblo was the most promising, indicating that it might have 10,000-13,000 acre-feet of fully consumable water available each year for a period of up to 20 years. Colo. Exh. 1205 at 17. While both Colorado Springs and Aurora were willing to discuss making excess water available, Dr. Eisel testified that there was "some question" whether Colorado Springs would have water available on a firm basis, and it was not clear that Aurora would have any water in dry years, unless an exchange agreement could be worked out with the City of Denver. RT Vol. 212 at 16, 21.

It also appeared that 12,000 acre-feet per year of fully consumable water might be available from New Century Energies. This company is the successor to the Public Service Company of Colorado which had acquired shares of stock in the Las Animas Consolidated Canal Company and the Consolidated Extension Canal Company for cooling water in connection with a proposed new power plant. Colo. Exh. 1205 at 17. The plant has not been built, and the water stock has been leased back to farmers on a temporary basis.

While these were considered to be "attractive sources" of repayment water, Dr. Eisel concluded that it would also be necessary to acquire water supplies presently used by irrigated agriculture. He proposed the establishment of a water bank to lease water rights and shares in ditch companies currently used for agricultural irrigation. Colo. Exh. 1205 at 18. His preference was to lease shares on a short term basis and fallow the land, rather than acquiring water rights on a permanent basis.

RT Vol. 212 at 25-26. The notion was to rotate fallowed lands in order to spread out the economic and environmental impacts. Based upon meetings with various ditch companies, Colorado concluded that there was "significant interest" among ditch company shareholders in participating in a water bank program. Colo. Exh. 1205 at 19.

D. Kansas' Concerns over the Water Repayment Proposal.

Five Kansas experts analyzed the water repayment proposal and testified as to various problems and concerns outlined below. These witnesses, in order, were C. Eugene Franzoy, Norman K. Whittlesey, Dale E. Book, Gregory K. Sullivan, and David L. Pope, Chief Engineer for the State of Kansas.

1. An underlying assumption of Colorado's water repayment program was that no further depletions would occur after 1996. Colo. Exh. 1205 at 6. Kansas experts challenged this assumption, testifying that the 1996 Use Rules would still leave depletions of approximately 7,335 acre-feet annually. Kan. Exh. 1027 at 30 *et seq.*, Table 4. Compact compliance for the years after 1996 was not part of this trial segment, and so the issue of any current depletions was not pursued. However, the Kansas evidence raises the question of whether excess water earmarked for the repayment program would be needed for current compact compliance.

2. Kansas experts were also of the opinion that Colorado had overestimated the amounts of excess municipal water potentially available. Based on information provided by the cities, Kansas concluded that the

sources would vary between 12,700 and 37,700 acre-feet annually, depending upon the type of hydrologic year. Kan. Exh. 1027, Table 2. Kansas evidence also reduced the yield of the power plant water by about one-half during dry years. Kan. Exh. 1027 at 18.

3. In regard to land fallowing for the water bank, Kansas concluded that approximately 43,000 acres annually would have to be fallowed, and perhaps more in some years. Kan. Exh. 1027 at 35, Table 7; RT Vol. 213 at 54-55. This amount included approximately 6,000 acres already being fallowed for current compact compliance. Colorado did not agree with this conclusion, but if it were true, Mr. Simpson testified that any such magnitude for fallowing would not be acceptable in Colorado. He stated:

> "SPECIAL MASTER: I understand that you may not agree with that amount. I'm just asking that if that were true, do you think that that's an order of magnitude that can be accepted by Colorado?
>
> THE WITNESS: No, I do not. That would be a large amount of dry-up, probably fairly significant impact on local economies. I can't imagine that we would get that type of sign-up or enrollment in the program unless we offered a significant incentive to do so, and that would drive the costs of the program up probably well beyond which would be appropriate, especially in light of the current situation with our legislature." RT Vol. 214 at 66-67.

4. Kansas also estimated that about 150,000 acre-feet of storage would be required, in contrast to the

30,000 acre-feet used by Colorado. Kan. Exh. 1027 at 35, Fig. 4; RT Vol. 213 at 57.

5. Mr. Pope also testified that there was a "fairly serious question" about whether Kansas farmers could use an additional 40,000 acre-feet of water in wet years, and at times whether they would have sufficient canal capacity to accept these flows. RT Vol. 214 at 11-13. Mr. Pope believed that an operations study would be required in order to fully evaluate the proposal. *Id.* at 21-22.

6. Finally, several Kansas experts testified that Colorado was underestimating the complexity of administering the fallowing program, and the accounting that would be required in John Martin Reservoir. RT Vol. 212 at 109-110, 114; RT Vol. 212 at 127-28, 132; RT Vol. 214 at 6-7, 18-19. Mr. Simpson thought that these problems might be "overstated," but that Kansas did raise "some legitimate concerns." RT Vol. 214 at 52, 57-58.

E. Conclusion.

Kansas has consistently sought a remedy in money damages, while Colorado's initial support for a water remedy, although not specifically withdrawn, has obviously diminished. As the Supreme Court has noted, making up past shortages by delivering more water has "all the earmarks of specific performance, an equitable remedy that requires some attention to the relative benefits and burdens that the parties may enjoy or suffer." *Texas v. New Mexico*, 482 U.S. 124 at 131. And here the plaintiff does not seek such equitable relief. Moreover, the total shortage has accumulated over almost fifty years. If this

were a money debt, the full amount would be due upon judgment and would bear interest if not paid. Allowing another fifteen years to settle the account in water, by paying simply the amount of the judgment, does not make Kansas whole. But aside from this inequity, and more fundamentally, I believe that the successful implementation of the water repayment program is too uncertain to be relied upon in a judgment. Kansas should be compensated for its past losses by monetary damages.

RECOMMENDATIONS

Following my Second Report in September of 1997, additional trial proceedings were held in May of 1998 to consider Colorado's compliance with its compact obligations for the period 1995-96. Then in November of 1999 the damage phase of the trial commenced, and was completed at the end of January 2000 as to damages through the year 1994. This Third Report presents my recommendations in connection with these trial proceedings. Accordingly, I recommend:

1. That depletions of usable Stateline flow for the 1995-96 period be determined to be 7935 acre-feet, bringing the total depletions for 1950-96 to 428,005 acre-feet. (July 28, 1999 Order, Exhibit 6 of the Appendix)

2. That the Court confirm my rulings (Exhibits 1 and 2 of the Appendix) that if a suitable remedy includes money damages, those damages should be based upon Kansas' loss rather than upon any gain to Colorado.

3. That the Court confirm my ruling (Exhibit 3 of the Appendix) that if a remedy includes money damages, the Eleventh Amendment does not preclude damages awarded to the State of Kansas from being based, in part, upon losses incurred by its water users.

4. That the court confirm my ruling (Exhibit 4 of the Appendix) that the unliquidated nature of Kansas' claim for damages does not bar the award of prejudgment interest.

5. That the remedy in this case should be in monetary damages, rather than repayment of the historic shortage by additional water deliveries.

6. That Kansas' damages should be determined on the basis of the analyses used by the Kansas experts.

7. That the categories of Kansas' damages should be calculated as provided in Sections V, VI, VII, VIII, IX and X of this Third Report.

8. That Kansas' damages should include prejudgment interest as provided in Section XI of this Third Report.

9. That my March 22, 2000 Order (Exhibit 7 of the Appendix) re mitigation of damages be confirmed.

10. That my May 1, 2000 Order (Exhibit 8 of the Appendix) re Colorado's objection to expert testimony on secondary economic damages be confirmed.

If the Court finds in accord with my recommendations in this Third Report, or otherwise, then I recommend that the case be remanded for further evidence: (1) to recalculate Kansas' damages in accordance with this Report, or as the Court may otherwise direct; (2) to calculate Kansas' damages for the period following 1994; and (3) to consider Colorado's compact compliance for the period after 1996, and any further depletions that may have occurred since that date.

Date: August 11, 2000

Respectfully Submitted,

ARTHUR L. LITTLEWORTH
Special Master

(43)

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No. 105, ORIGINAL

In The

Supreme Court of the United States

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

and

UNITED STATES OF AMERICA,

Defendant-Intervenor.

ARTHUR L. LITTLEWORTH, Special Master
THIRD REPORT
APPENDIX (EXHIBITS 1-9)

August 2000

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Section XIII of Second Report (Measure of Damages – Colorado Gain or Kansas Loss)

SECTION XIII

THE MEASURE OF DAMAGES – COLORADO GAIN OR KANSAS LOSS

In the event that the remedy for past depletions of usable Stateline flow should be in the form of monetary damages, Kansas contends that the measure of the remedy "should be the greater of Colorado's gains or Kansas' losses." Kan. Brief re Statement of Position at 23. Moreover, Kansas states that Colorado's benefits from violating the compact "are expected to be higher than Kansas' injury," and, if so, the amount of the recovery should correspond to the gains in Colorado resulting from the use of Kansas' entitlement. *Id.* at 4. There is no direct Supreme Court precedent on the measure of damages in a case such as this.

While this issue has been presented on briefs, earlier evidence in the trial outlines generally the kind of benefits that have accrued to Colorado farmers from increased use of groundwater. Much of the uncertainty and insecurity associated with surface flows were eliminated. Water became available when needed to improve crop yields. Total water supplies were increased for typically water-short ditches. Some high value specialty crops became possible. In short, overall farm productivity increased, but at the cost of depletions at the Stateline. The Kansas argument begins by characterizing these benefits as "ill-gotten gains," or "illegal profit," and relies on cases that do use these terms and order the divestment of the "benefits of unlawful activity." Kan. Brief re Statement of Position at 5, 8, 9. Kansas argues further that all such benefits or gains should be eliminated in order to

minimize the incentives that a state might otherwise have to violate an interstate compact or, at least, to neglect to comply therewith. *Id.* at 5, 6-7.

At the outset, I believe that Kansas' characterization of the increased use of groundwater in Colorado is unduly harsh. Most of the postcompact wells in Colorado were lawfully drilled at a time when wells were unregulated. When Kansas filed this case, there were approximately 2062 large irrigation wells, of which 1842 were in existence before 1965. Colo. Exh. 165*, Table A-1. As the Colorado Supreme Court noted in one of its decisions, there had been "virtually no regulation of wells" prior to the adoption of the 1973 Rules. Colo. Exh. 387 at 296. However, if Colorado was slow in coming to grips with well development, so was Kansas. In Kansas, about 416 wells were in existence in 1949 in the three-county area from the Stateline to Garden City. Colo. Exh. 257*. This number had increased to 1999 by 1985. *Id.*; RT Vol. 86 at 109-111. For the period 1968-85, pumping within the several canal company service areas in Kansas averaged about 79,400 acre-feet annually. It reached a high of 149,800 acre-feet in 1981. Kan. Exh. 327 at 9, Table 10A. Kansas did not begin to regulate well through the issuance of permits until 1978. RT Vol. 28 at 6; RT Vol. 37 at 27, 32.

In both states, sophisticated systems for the establishment and regulation of surface water rights had long been in place. However, before the development of the vertical turbine pump and the availability of inexpensive electrical power, there had been little regulatory need to be concerned about groundwater pumping. The "big surge" in well development along the Arkansas River

came in the 1950s and early 1960s when there was no governmental system in either Colorado or Kansas to regulate well drilling and pumping. RT Vol. 76 at 102.

Although by the 1970s the extent of pumping in Colorado was a matter of common knowledge, that is not to say, as I concluded in my earlier report, "that the impact of such pumping on usable Stateline flows was generally known or understood." Report of Special Master at 169. Wells *per se* do not violate the compact. Only if they cause a material depletion in usable Stateline flows are they wrongful. Determining what flows are usable, and the depletions of usable flow in contrast to depletions of total flow, is a complex matter. And as the Supreme Court noted in its earlier Opinion, isolating the impacts of wells on usable Stateline flow was rendered all the more difficult because of other changing conditions during the 1970s and 1980s. The 1970s were generally dry years, and some reduction in flow would have occurred apart from pumping. Pueblo Dam came on line in 1976 and began to reregulate native flows. Transmountain imports were also increased during this period, which to some extent provided an offset to pumping. The Winter Water Storage Program was instituted. Finally, there was no quantitative or specific entitlement against which depletions to usable flow could be judged. *Kansas v. Colorado* 514 U.S. 675, 131 L.Ed.2d 759, 775, 115 S.Ct. 1733 (1995).

This is not a case in which Colorado deliberately set out to reap the benefits of a wilful failure to perform its obligations under the compact. Had its actions been intentionally illegal, or as wilful and knowing as the factual situations in the cases on which Kansas relies,

there might have been more validity to Colorado's defense of laches.

Both states recognize that an interstate compact is both a contract and a law of the United States. *Petty v. Tennessee-Missouri Ridge Commission*, 359 U.S. 275, 285, 3 L.Ed.2d 804, 79 S.Ct. 785 (1959); *Texas v. New Mexico*, 462 U.S. 554, 564, 77 L.Ed.2d 1, 103 S.Ct. 2558 (1983). Thus, treating Colorado's violations of the compact as a violation of federal law, Kansas cites a number of cases upholding the equitable jurisdiction of the courts to order the disgorgement of profits illegally acquired. The leading case is *Porter v. Warner Holding Co.*, 328 U.S. 395, 90 L.Ed.1332, 66 S.Ct. 1086 (1946). That suit, brought by the Price Administration under the Emergency Price Control Act of 1942, sought restitution of rents collected in excess of required rent ceilings. The District Court enjoined future excess charges, but held that it lacked jurisdiction to order restitution. The Supreme Court found, however, that the absence of specific authority in the statute did not limit the broad equitable powers of a court to secure complete justice, and to compel the defendant to "disgorge profits." 328 U.S. at 398-99. Restitution of the excessive rent charges gave effect to "the policy of Congress," and the case was remanded so the court could "exercise the discretion that belongs to it." 328 U.S. 395 at 400, 403.

The same issue of whether a court's equitable jurisdiction was limited by the remedies authorized by the statute arose in *Mitchell v. Robert De Mario Jewelry*, 361 U.S. 288, 4 L.Ed.2d 323, 80 S.Ct. 332 (1960). In that case, several employees had sought the aid of the Secretary of Labor under the Fair Labor Standards Act to recover

wages allegedly unpaid. Ultimately, the employer retaliated by discharging the employees, and the Secretary brought suit to require reinstatement and to recover the payment of lost wages. While the statute did not specifically provide for the recovery of lost wages, the Supreme Court found that a court of equity had inherent jurisdiction to give effect to the policy of the legislature, and that the statute should not be lightly interpreted to deprive the courts of this power.

These two Supreme Court decisions are frequently cited in enforcement actions of other federal statutes, supporting the equitable power of courts to order disgorgement as a remedy "for the purpose of depriving the wrongdoer of his ill-gotten gains and deterring violations of the law." *Commodity Futures Trading Commission v. American Metals Exchange Corp.*, 991 F.2d 71 (3rd Cir. 1993). See *CFTC v. Hunt*, 591 F.2d 1211 (2nd Cir. 1979) involving the Commodity Exchange Act; *SEC v. Patel*, 61 F.3d 137 (7th Cir. 1995) involving deliberate fraud against the FDA, a 27-month term of imprisonment, and violations of the Securities Exchange Act; and *Interstate Commerce Commission v. B & T Transportation Co.*, 613 F.2d 1182 (1st Cir. 1980) involving an action under the Motor Carrier Act to enjoin the collection of charges not reflected in filed tariffs, and for restitution of the overcharges.

In these cases, we find the courts exercising equitable jurisdiction to recover excess charges, to disgorge illegal profits gained from insider trading information, and to require payment of lost wages. Each case represents an aspect of the court's broad equitable powers. At the same time, however, it is recognized that the *exercise* of such jurisdiction remains a matter of discretion:

> "The inherent equitable jurisdiction which is thus called into play clearly authorizes a court, *in its discretion*, to decree restitution of excessive charges in order to give effect to the policy of Congress." *Porter v. Warner Holding Co., supra*, 328 U.S. at 400, emphasis added.

In the context of the present case, it is my view that the quantification of damages proposed by Kansas reaches too far, and if money is to be part of the remedy, that the Court's discretion should be exercised to limit the measure of damages to the losses suffered by Kansas. As I indicated in my first Report:

> "I do not believe that Colorado officials thought they were sanctioning a compact violation in the well regulations that were established, or in their failure to adopt specific regulations to protect usable Stateline flows, or in the issuance of new well permits." Report at 169.

The lack of wilfulness behind Colorado's violation of the Compact serves to distinguish the cases cited by Kansas in support of its proposed measure of damages.

Moreover, while Kansas should be made whole with respect to past violations of the compact, it is also appropriate that the remedy not result in a windfall. If it is true that differences in soils, climate, crop values, economic multipliers or other factors may result in a higher value for Arkansas River water used in Colorado than in Kansas, reliance upon those factors to quantify damages could result in a windfall recovery. This issue surfaced in *Texas v. New Mexico* before the damages were settled by stipulation. New Mexico cited two reports prepared by Texas' economist. These reports apparently estimated that

Texas' losses from past underdeliveries were approximately 50 million dollars. On the other hand, the reports indicated that New Mexico obtained an economic benefit from the use of that water in excess of one billion dollars. While New Mexico stated that these values were grossly exaggerated, it did not dispute "the qualitative fact that New Mexico's economic benefit from not delivering a quantity of water at the state line (or her economic loss from having to deliver it) greatly exceeds the economic benefit that Texas could gain from using the same quantity of water." New Mexico's Pre-hearing Brief at 15, fn. 10. The issue of a possible windfall was not settled in *Texas v. New Mexico*. However, it does not seem appropriate that Kansas' recovery in money should exceed what would have occurred had there been no violation of the compact.

Kansas argues that quantifying damages in terms of Colorado's gain is neither a windfall nor a penalty, but rather minimizes the incentive that a state would otherwise have to evade the obligations imposed by an interstate compact. This argument was also touched upon in *Texas v. New Mexico* where the court stated:

> "It might also be said that awarding only a sum of money would permit New Mexico to ignore its obligation to deliver water as long as it is willing to suffer the financial penalty. But in light of the authority to order remedying shortfalls to be made up in kind, with whatever additional sanction might be thought necessary for deliberate failure to perform, that concern is not substantial in our view." 482 U.S. at 132.

I do not see the measure of damages suggested by Kansas as being an effective deterrent to compact violations. Interstate water cases are simply too complex to be guided by the potential form of remedy. And I have no doubt about the power of equity to provide complete relief, perhaps even looking to upstream gain under appropriate circumstances.

While an interstate compact approved by Congress becomes a law of the United States, still a "Compact is, after all, a contract." *Petty v. Tennessee-Missouri Bridge Commission*, 359 U.S. 275, 285, 3 L.Ed.2d 804, 79 S.Ct. 785 (1959); *Texas v. New Mexico*, 482 U.S. 124 at 128, 96 L.Ed.2d 105, 107 S.Ct. 2279 (1987). Ordinarily, contract damages are based upon the injured party's "expectation interest," as measured by:

(a) The loss in the value to the injured party of the other party's performance caused by its failure or deficiency, plus

(b) Any other loss, including incidental or consequential loss, caused by the breach, less

(c) Any cost or other loss that the injured party has avoided by not having to perform.

Restatement (Second) of Contracts § 347 & comment (1979). In the alternative, damages may be awarded based upon the injured party's reliance interest. *Id.* at Section 349. Thus, under general principles of contract law, money damages would not be based upon Colorado's benefit, but rather on Kansas' loss. Kansas cites some specific performance and trust cases, but those precedents are not applicable to these facts.

It should be remembered, however, that this is not merely an action at law for breach of contract. It is a case between two states brought under the original jurisdiction of the United States Supreme Court. The court's jurisdiction in such cases is "basically equitable in nature." *Ohio v. Kentucky*, 410 U.S. 641, 648, 35 L.Ed.2d 560, 93 S.Ct. 1178 (1973). Yet the court's power is not restricted by traditional equity rules. As I wrote in my earlier opinion:

> "It would be a mistake, however, to decide the issue solely on the basis of conventional equity rules. In establishing the Supreme Court's original jurisdiction over litigation between states, the constitution does not speak of 'cases in law or equity,' as it does in certain other situations. Rather it refers simply to 'controversies' between states. Commentary on the difference between cases and controversies has been inconsistent and inconclusive (see 36 CJS 20 [Federal Courts § 1]; 1A CJS 302, 315, 316 [Actions §§ 1, 5c, 6]), but the constitutional language does suggest that the interstate jurisdiction is not necessarily locked into rules of either common law or equity. And in exercising this 'unprecedented' grant of judicial power (Charles Warren, 'The Supreme Court and Sovereign States,' [Stafford Little Lectures for 1924], Princeton Univ. Press, p. 32), the Court has treated it as sui generis – a substitute for the treaty and war powers which the states surrendered when the constitution was established. *Rhode Island v. Massachusetts*, 37 U.S. (12 Pet.) 657, 725, 9 L.Ed. 1233, 1260 (1838); *Kansas v. Colorado*, 185 U.S. 125, 140, 46 L.Ed. 838, 844, 22 S.Ct. 552 (1902); *North Dakota v. Minnesota*, 263 U.S. 365, 372-73, 68 L.Ed. 342, 345, 44 S.Ct. 138

(1923); *Idaho v. Oregon*, 462 U.S. 1017, 1031, note 1, 77 L.Ed.2d 387, 400, 103 S.Ct. 2817 (1983).

As Chief Justice Taney explained in 1855, traditional chancery practice is an 'analogy' in these cases but is not controlling. *Florida v. Georgia*, 58 U.S. (17 How.) 478, 492, 15 L.Ed. 181, 189 (1855). Thus viewed, the inquiry really is one of fundamental justice rather than what is the historical or even the current practice of courts exercising less extraordinary powers. It is in this sense that the Court has observed that proceedings under its original jurisdiction are 'basically' equitable in nature. *Ohio v. Kentucky, supra*, 410 U.S. at 648, 35 L.Ed.2d at 567, 93 S.Ct. 1178 (1973)." Report at 150-51.

Most recently, the Court has indicated that the remedy in a compact case, which I deem to include the measure of damages, should provide a "fair and equitable solution that is consistent with the Compact terms." *Texas v. New Mexico*, 482 U.S. 124, 134 (1987).

A. Conclusion.

I conclude, therefore, that if a suitable remedy in this case should include money damages, those damages should be based upon Kansas' loss rather than any gain to Colorado, subject to the overriding consideration that the remedy provide a fair and equitable solution.

APPENDIX – Exhibit 2

Order dated July 28, 1999 re Colorado's Motion in Limine to Exclude Evidence of Colorado's Benefits from Violations of Arkansas River Compact

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant, UNITED STATES OF AMERICA, Intervenor.	)	No. 105 Original October Term, 1998

ORDER GRANTING COLORADO'S MOTION IN LIMINE TO EXCLUDE EVIDENCE OF COLORADO'S BENEFITS FROM VIOLATIONS OF THE ARKANSAS RIVER COMPACT

(Filed July 28, 1999)

On May 7, 1999, the State of Colorado moved the Special Master to enter an order excluding any evidence of Colorado's benefits from violations of the Arkansas River Compact. The motion was precipitated by certain Kansas expert reports in support of its claim for money damages. These reports were submitted to Colorado in accordance with a prior order, and in preparation for the trial segment on remedies scheduled to begin November 8, 1999. Included in these reports was a section entitled "Colorado's Benefits From Violations of the Arkansas River Compact." The motion is based on the claim that such evidence is contrary to one of my rulings in the Second Report. In that report, I recommended to the Supreme Court:

> "That if a suitable remedy in this case should include money damages, those damages should

> be based upon Kansas' loss rather than upon any gain to Colorado, subject to the overriding consideration that the remedy provide a fair and equitable solution." (Page 113)

On July 7, 1999, Kansas filed a brief in response to Colorado's motion, and Colorado replied on July 19, 1999.

In the briefing on certain legal issues leading to my Second Report, Kansas contended that if the remedy for past depletions should be in the form of monetary damages, the measure "should be the greater of Colorado's gains or Kansas' losses." (Second Report at 75) Kansas stated that Colorado's benefits from violating the compact were expected to be "higher than Kansas' injury," and, if so, the amount of the recovery should correspond to the gains in Colorado resulting from the use of water to which Kansas was entitled. Kansas characterized these benefits as "ill-gotten gains" or "illegal profit," and relied on a line of cases upholding the equitable jurisdiction of the courts to order the disgorgement of profits illegally acquired. However, I found that these cases were distinguishable.

Kansas' characterization of the increased use of groundwater in Colorado was, I believe, "unduly harsh." (Second Report at 76) Most of the postcompact wells in Colorado were lawfully drilled at a time when wells were simply unregulated. The situation in Kansas was similar. While both states had established sophisticated systems for the regulation of surface water rights, neither state moved quickly to address groundwater pumping. The big surge in well development along the Arkansas River occurred in the 1950s and early 1960s with the development of the vertical turbine pump and the availability of

inexpensive electrical power. However, Kansas did not begin to regulate wells through the issuance of permits until 1978, and there was "virtually no regulation of wells" in Colorado prior to 1973. (Colo. Exh. 387 at 296)

I concluded in my Second Report that this is not a case in which Colorado "deliberately set out to reap the benefits of a wilful failure to perform its obligations under the compact," and that the Kansas cases were inapplicable under the facts of this case. (Second Report at 77) Moreover, the Kansas approach opens up the possibility of a windfall. I concluded further that it did not seem appropriate that any Kansas money damages should exceed what would have occurred had there been no violation of the compact. (Second Report at 81) In short, the Second Report rejected the Kansas theory of using Colorado benefits to measure any money remedy.

The Second Report was submitted to the Supreme Court in September, 1997, and exceptions were invited. (118 Sup.Ct. 39) It is not insignificant that Kansas took no exceptions to this Report, and urged the Court to "accept" the Report.[1]

The Colorado brief in support of its motion is short and straightforward, i.e., the issue of using Colorado

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[1] The Second Report quantified shortages for the period 1950-94, and also recommended two other legal rulings in Kansas' favor, namely, (1) that the Eleventh Amendment does not bar any money damages awarded to Kansas from being based, in part, on losses incurred by its water users; and (2) that the unliquidated nature of Kansas' claim for damages does not bar the award of prejudgment interest.

benefits as a measure of damages has been decided. Kansas, however, relies upon the caveat to that ruling, namely, that it would be "subject to the overriding consideration that the remedy provide a fair and equitable solution." While not proposing now that Colorado benefits be used directly to establish a money remedy, Kansas argues:

> "Even though the presumed measure of damages is not Colorado's gains, Kansas understands the Special Master's recommendation to allow evidence of Colorado gains to show that Kansas' proposed remedy on its losses provides 'a fair and equitable solution,' which is, after all, 'the overriding consideration.' " (Kansas Response at 4)

Kansas asserts that the ruling in the Second Report does not mean that no evidence of Colorado benefits can be used for any purpose. Kansas cites the recognized rule in original actions that the Court "has always been liberal in allowing full development of the facts." (*United States v. Texas* (1950) 339 U.S. 707, 715)

Colorado responds that the Court's policy applies only to providing facts that are in some way relevant to the controversy before the Court; that the proposed evidence is not relevant; and that Colorado should not be put to the time and expense of evaluating and responding to evidence that "appears to be completely irrelevant." (Colorado's Reply at 3) However, more is involved here than mere relevancy. Kansas proposes to use evidence of a legal theory that has already been ruled inappropriate to buttress an approved legal theory. We may expect, as Kansas has already indicated, that the dollar benefits to

Colorado might exceed losses to Kansas. But that cannot color Kansas' remedy. Any money damages to Kansas must stand on their own facts and legal basis. They do not become a more "fair and equitable solution" by comparison to an improper measure.

As to the meaning of the requirement that any remedy must provide a "fair and equitable solution," I expect there will be ample opportunity to consider that language within the traditional framework of injury to Kansas. (*Texas v. New Mexico* (1987) 482 U.S. 124, 134) Even in ordinary cases, and much less in a case of original jurisdiction, there is no single prescribed formula for determining damages. Moreover, in this case, the issue of prejudgment interest must be considered. There is no absolute right to such interest, and even in admiralty cases whether it should be allowed rests "very much in the discretion of the tribunal." (*City of Milwaukee v. Cement Division, National Gypsum Co.* (1995) 515 U.S. 189, 132 L.Ed.2d 148, 115 S.Ct. 2091) Such interest is not recoverable "according to a rigid theory of compensation for money withheld, but is given in response to considerations of fairness." (*Jackson County v. United States* (1939) 308 U.S. 343, 352, 84 L.Ed. 13, 60 S.Ct. 295) Moreover, according to the United States, the liability of an individual state for prejudgment interest "remains an open question." (United States Brief on Exceptions to Second Report at 21)

For the reasons herein stated, Colorado's motion in limine is granted.

DATED: July 28, 1999.

/s/ Arthur L. Littleworth
ARTHUR L. LITTLEWORTH
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business address is Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502.

I am readily familiar with Best, Best & Krieger's practice for collecting and processing correspondence for mailing with the United States Postal Service. Under that practice, all correspondence is deposited with the United States Postal Service the same day it is collected and processed in the ordinary course of business.

On July 28, 1999, I served the within **ORDER GRANTING COLORADO'S MOTION IN LIMINE TO EXCLUDE EVIDENCE OF COLORADO'S BENEFITS FROM VIOLATIONS OF THE ARKANSAS RIVER COMPACT** by placing a copy of the document in a separate envelope for each addressee named below and addressed to each such addressee as follows:

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On July 28, 1999, at the office of Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502, I sealed and placed each envelope for collection and deposit by Best, Best & Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on July 28, 1999, at Riverside, California.

/s/ Sandra L. Simmons
Sandra L. Simmons

APPENDIX – Exhibit 3

Section XIV of Second Report (Eleventh Amendment)

SECTION XIV

THE ELEVENTH AMENDMENT

A. Introduction.

If money damages are to be awarded, Colorado contends that the 11th Amendment to the United States Constitution precludes any recovery based on losses sustained by individual water users in Kansas. That Amendment provides:

> "The judicial power of the United States shall not be construed to extend to any suit in law or equity, commenced or prosecuted against one of the United States by Citizens of another State, or by Citizens or Subjects of any Foreign State."

The Amendment was adopted in 1797 out of concern that the federal courts would otherwise entertain private suits against states without regard to the sovereign immunity which they had enjoyed before ratification of the constitution. *Chisholm v. Georgia*, 2 U.S. [2 Dall.] 419, 1 L.Ed. 440 (1972). Apparently the failure to raise the issue at the constitutional convention had been something of an oversight, and there was general support for liberating the states from the prospect of adverse federal litigation, especially litigation by British creditors.

In our own time, renewed political interest in states' rights has prompted a resurgence of 11th Amendment discussion, and the Court has reviewed the origins and history of the amendment at some length. See, for example, the several opinions in *Seminole Tribe of Florida v. Florida*, 517 U.S. ___, 134 L.Ed.2d 252, 116 S.Ct. 114 (1996). The majority there held that Congress did not have the power under the Indian Commerce Clause to abrogate a

state's sovereign immunity. Even more recently, the Court has considered the scope of the *Ex parte Young* doctrine which allows suits under appropriate circumstances to proceed against state officers for injunctive relief based on alleged violations of federal law. *Idaho v. Coeur d'Alene Tribe of Idaho*, 1997 U.S. Lexis 4030. However, such a suit cannot be the functional equivalent of a suit against the state so as to render its 11th Amendment protection meaningless.

At the outset two distinctions need to be made:

(1) Unlike many 11th Amendment cases, ours does not involve the issue of jurisdiction itself. The Court has already taken jurisdiction, and in fact has determined the liability questions associated with the dispute. The questions which now implicate the 11th Amendment have to do with remedy – the extent to which the Court may look to losses sustained by farmers in Kansas when fashioning an award to the State of Kansas.

(2) In the final paragraph of its briefing on this subject (pages 40-41), Colorado refers to two types of damages which apparently it recognizes as proper under the 11th Amendment: damages based on injury to Kansas' own proprietary rights, and damages based on Kansas' role as a "quasi-sovereign."[1] Kansas has not yet

[1] "Finally, if repayment is in money, it must be limited to damages on Kansas' proprietary and quasi-sovereign interests. The Eleventh Amendment precludes an award based on the economic injuries of individual Kansas water users." Colo. Reply Brief at 40-41. Colorado also states that it does not dispute that injury to the Kansas general economy and loss of governmental revenue would be appropriate to consider. Colo. Reply Brief at 26.

pointed to proprietary losses of its own, and therefore our inquiry into the 11th Amendment at this point becomes a question of whether injuries to Kansas citizens are embraced within the concept of quasi-sovereignty, or whether there is any other basis for including the losses to Kansas water users in determining Kansas' damages.[2]

During oral argument on a draft of this Second Report, counsel for Colorado responded that damages to Kansas' proprietary rights might include reduction in the State's groundwater supplies, caused by diminished recharge from the river and increased pumping to make up for river shortages.[3] RT Vol. 169 at 58-59. Counsel also indicated that probably some losses to the general economy of Kansas could be established. *Id.* at 59. It is not clear whether these losses would be considered as injuries to proprietary or quasi-sovereign rights. Nonetheless, in determining such damages counsel acknowledged that it would be necessary to begin the analysis with losses suffered by Kansas water users as a result of the compact violations. *Id.* at 59-61. However, in his view, the 11th Amendment would preclude their inclusion in the ultimate damage figure.

[2] Kansas takes the view that its entitlement "to a complete remedy for breach of the Compact" arises from its sovereign interest as a *party* to the Compact, and not from a *parens patriae* or quasi-sovereign interest. Kan. Reply Brief at 27, emphasis added.

[3] Counsel cautioned, however, that Colorado had not engaged an economist, and his responses to my questions on damages, and how damages should be determined, were without benefit of expert help, and should be understood with that reservation. RT Vol. 169 at 58, 60.

Although not always referred to by that name, quasi-sovereignty is of long standing in our law. It does not lend itself to a "simple or exact definition." *Alfred L. Snapp & Son v. Puerto Rico*, 458 U.S. 592, 601, 73 L.Ed.2d 995, 102 S.Ct. 3260 (1982). It refers to action by a state which is not based on its own proprietary or other rights as a sovereign, nor on private interests pursued by the state as a nominal party. Rather, it is a general interest that the state has in the well-being of its citizens, and which it is fitting that the state promote and defend in court. Colorado acknowledges that a state's quasi-sovereign and *parens patriae* interests are sufficient under a number of cases to support jurisdiction here and the issuance of injunctive relief. Colo. Reply Brief at 34. But Colorado contends that these authorities should not be read as allowing a state "to make claims on behalf of individual citizens," or to collect damages "based on injuries suffered by individual water users." *Id.* at 35, 2.

Of course, this action is no mere contrivance by Kansas to obtain damages for its water users. Rather, it is the State of Kansas that seeks damages, which it contends should be measured in part by the losses suffered by individual farmers. In *Texas v. New Mexico*, counsel argued that any such damages might go into the state's general fund, "rather than benefit those who were hurt." 482 U.S. at 132, n. 7. The Supreme Court responded:

> "But the basis on which Texas was permitted to bring this original action is that enforcement of the Compact was of such general public interest that the sovereign State was a proper plaintiff. See *Maryland v. Louisiana*, 451 U.S. 725, 735-739 (1981). It is wholly consistent with that

> view that the State should recover any damages that may be awarded, money she would be free to spend in the way it determines is in the public interest." *Texas v. New Mexico*, 482 U.S. at 132 n.7.

It is the same situation here. Any damages will go to the State of Kansas, to be spent as it decides, and not to individual water users.

It is interesting to note, however, that Colorado's proposed "water remedy" seems to run contrary to its views on the 11th Amendment. Colorado proposes to make up the historic shortfall in usable Stateline flows by delivering additional quantities of water (over and above that which may be required for current compact compliance) to present and future users of Arkansas River water in Kansas. Such deliveries likely would be of direct benefit to Kansas farmers – as opposed to damages paid to the State of Kansas – as compensation for past violations of the compact. In short, Colorado seems to contend that the 11th Amendment bars money compensation to the state based on losses to its citizens, but does not preclude compensation in water which may be delivered directly to those citizens. However, in oral argument Colorado responded that any deliveries of water under a water remedy would be made at the Stateline to Kansas, not to its users. It argued that Kansas could require that the excess water be used, for example, to recharge a groundwater area of the state that had nothing to do with the compact or the Arkansas River. RT Vol. 169 at 70-73. To be sure this might be theoretically possible, but also highly unlikely. In all probability, make-up water delivered into the Arkansas River and measured at the Stateline would

go to the benefit of those ditch systems that were shorted by virtue of the compact violations.

B. The Shaping of the Law.

In my review of this subject, I have found it helpful to examine the cases more or less chronologically, since there has been some shaping of the underlying principles over the years.

At first the only interstate cases under the Court's original jurisdiction were boundary cases. By their very nature such disputes involve sovereignty. They involve territory, a piece of the state itself, and obviously the state has a direct governmental interest as a state. But citizens, residents and property owners in the affected area are also directly impacted. A judgment adjusting a boundary determines whose laws are to be obeyed, whose officials will levy taxes, whose judges will decide cases, and whose rules will be used to deraign titles and resolve commercial disputes. Substantial private gains and losses can result, and it is clear that private rights of the type contemplated by the amendment will at times be adjudicated by the federal judiciary.

Notwithstanding this inevitable involvement of private rights in boundary cases, the early Court refused to accept jurisdiction over strictly private disputes. Not surprisingly, a number of attempts to avoid this result were made, sometimes with the active participation of a plaintiff state. See e.g., *New Hampshire v. Louisiana*, 108 U.S. 76, 27 L.Ed. 656, 2 S.Ct. 176 (1883), where bonds of the State

of Louisiana were assigned to the State of New Hampshire by one of its citizens for collection by the State. All expenses of litigation were paid by the original private bondholder. No state funds could be expended in the proceedings, and any recovery had to be paid over by New Hampshire to the original bondholder. The Court found that the state could not "allow the use of its name in such a suit for the benefit of one of its citizens" in order to avoid the 11th Amendment. *Id.* at 661.

These efforts seem to have come to a head in 1904 with the Court's decision in *South Dakota v. North Carolina*, 192 U.S. 286, 48 L.Ed.448, 24 S.Ct. 269 (1904). Two brothers, bankers and brokers in New York City, owned a large number of railroad bonds on which the State of North Carolina had become liable. The State of South Dakota, by statute, arranged to accept a donation of ten of the bonds and then brought suit to enforce them in the United States Supreme Court under original jurisdiction. South Dakota also named as defendants two individuals as representatives of other bondholders. While no conditions were attached to the state's title to its bonds, the Court acknowledged that the gift was made under the "not unreasonable expectation" that South Dakota's action "might enure to his benefit as the owner of other like bonds." *Id.* at 310. The Court, in a 5 to 4 decision, with a strong dissent by Mr. Justice White, accepted jurisdiction and gave judgment for South Dakota – but only on the bonds which it directly owned. The separate cause of action in which South Dakota sought relief for the other bond holders on class action principles was summarily rejected by the majority. In short, none of the

Justices was willing to allow private claimants to ride on the coattails of this interstate suit.

The law has now been long established that the state must be more than a nominal party if the protection of the Eleventh Amendment does not apply. *Maryland v. Louisiana*, 451 U.S. 725, 737, 68 L.Ed.2d 576, 101 S.Ct. 2114 (1981); *Alfred L. Snapp & Son v. Puerto Rico*, 458 U.S. 592, 73 L.Ed.2d 995, 102 S.Ct. 3260 (1982). In order to invoke the original jurisdiction of this Court, the state must bring the action "on its own behalf and not on behalf of particular citizens." *Hawaii v. Standard Oil Company of California*, 405 U.S. 251, 258 fn. 12, 31 L.Ed.2d 184, 92 S.Ct. 885 (1972).

Shortly thereafter, in 1907, the decision in *Kansas v. Colorado*, 206 U.S. 46, 51 L.Ed. 956, 27 S.Ct. 655 (1907) established the principle of equitable apportionment of interstate streams; Kansas was allowed to sue on behalf of its citizens claiming rights to Arkansas River water. The alleged facts demonstrated a sound basis for quasi-sovereignty, but the extent of relief available in such an apportionment remained uncertain because of the factual finding that Colorado had not deprived Kansas of its share of the river. This case and its predecessor, *Kansas v. Colorado*, 185 U.S. 125, 46 L.Ed. 838, 22 S.Ct. 552 (1902) are among the cases cited more recently by the Court as examples of states successfully representing the interests of their citizens. *Alfred L. Snapp & Son v. Puerto Rico*, 458 U.S. 592, 603, 73 L.Ed.2d 995, 102 S.Ct. 3260 (1982).

Fifteen years later, in a dispute involving the Laramie River, the Court decided another interstate stream apportionment, and this time there was a judgment ordering

relief. *Wyoming v. Colorado*, 259 U.S. 419, 66 L.Ed. 999, 42 S.Ct. 552 (1922). However, on the question of the scope of relief, the decision is of limited value as a precedent since both states follow the rule of prior appropriation, and for that reason the Court held that it would use that doctrine as the standard for dividing the river between them.

Nonetheless, of special relevance to the present issue is the way in which the Wyoming decision determined each state's share of the stream. The Court based its apportionment directly on the water rights of individual water users. Moreover, in doing so, it expressly adjudicated particular water rights which happened to be in controversy. For example, the opinion discussed at length the evidence relating to one priority date which Colorado claimed under the doctrine of relation, and it was held that the correct date was substantially later. Colorado's position throughout that litigation was that the case was one solely between two states, and that the Court could not determine private water rights. The Court, however, in effect abolished the line between the two states, recognizing an interstate priority for each appropriation.

Over the next eighteen years the Court issued three additional Laramie River decisions clarifying what it had done – clarification of particular significance to the argument presented by Colorado now. In *Wyoming v. Colorado No. 2*, 286 U.S. 494, 76 L.Ed. 1245, 52 S.Ct. 621 (1932), the Court issued an injunction enforcing one of the water rights it had recognized in the original decision – thus suggesting that in 1922 it had actually adjudicated private claims on the river. Then in *Wyoming v. Colorado No. 3*, 298 U.S. 573, 80 L.Ed. 1339, 56 S.Ct. 912 (1936), the Court emphasized the overriding importance of the total

amount allowed to Colorado, but nevertheless, issued an injunction as to one specific water right which had been covered in the original decree. The result was to leave the matters somewhat uncertain as to what the Court had undertaken to do. Finally, in *Wyoming v. Colorado No. 4*, 309 U.S. 572, 84 L.Ed. 954, 60 S.Ct. 765 (1940), the Court discussed all three of the previous cases and explained what had actually been intended.

With respect specifically to the injunction issued in the 1936 decree, the Court explained (309 U.S. at 579) that "this was manifestly upon the assumption that Colorado was otherwise using the total amount of water allocated to that State." The Court added that "it was not intended to restrict Colorado in determining the use of the water of the river, according to Colorado laws and adjudications, provided the diversions did not exceed the aggregate amount of 39,750 acre feet to which Colorado was entitled . . . " The holding was that the total share allocated to each state was the true adjudication of 1922, and each state was thereafter free to adjust individual rights within its borders in accordance with its own laws. Mr. Justice Van Devanter's painstaking evaluation of individual rights in 1922 was merely a means to an end; the individual rights served only as a *basis* for the overall apportionment of the stream between Colorado and Wyoming. In short, the Court in 1922 did exactly what Colorado now says it cannot do.

Meanwhile, in the year following *Wyoming v. Colorado No. 1*, the Court reiterated its opposition to actual adjudication of private claims in a suit between states. *North Dakota v. Minnesota*, 263 U.S. 365, 68 L.Ed. 342, 44 S.Ct. 138 (1923). This time the subject was not bonds but water

damage on an interstate stream. North Dakota alleged that construction work by Minnesota upstream had caused flooding in North Dakota with resulting damage to North Dakota itself (in the amount of $5,000) and to individual farms (in the amount of over $1 million). Ultimately the Court found that Minnesota was not responsible for the damage. However, it held that on proper facts it would issue an injunction in favor of North Dakota, but would not entertain the claims of the individual farmers even though presented by the state. Simply put, it reiterated the position taken in *South Dakota v. North Carolina*.

However, I find no inconsistency in the Wyoming and North Dakota cases. In Wyoming, individual claims were recognized as a basis for determining the state's total share of the stream. In North Dakota, individual damage claims were refused recognition because recovery was sought for the claimants themselves, who were actually financing the litigation. The Court found that each of the farm owners expected "to share in the . . . damages here sought in proportion to the amount of his loss," and that it was "inconceivable" that North Dakota would prosecute the damage phase of the case without intending to turn any recovery over to the individual farm owners. 263 U.S. at 375.

On the same day as the original Wyoming decision (and by means of a one-sentence reference to the principles of that case) the Court held that a Nebraska corporation could appropriate water of the North Fork of the Republican River in Colorado, and transport it across the state line for use in Nebraska. This was true notwithstanding Colorado's claim to ownership of, and the power to regulate, all the waters within its boundaries.

Weiland, State Engineer of Colorado, v. Pioneer Irrigation Co., 259 U.S. 498, 502, 66 L.Ed. 1027, 42 S.Ct. 568 (1922). There was no apportionment by the Court, but the right of Nebraska citizens to some share of this interstate stream was declared to be constitutional.

In 1938, the Court in *Hinderlider v. La Plata River & Cherry Creek Ditch Co.*, 304 U.S. 92, 82 L.Ed. 1202, 58 S.Ct. 803 (1938), reaffirmed and expanded on the principles of the Kansas and Wyoming decisions. As its title indicates, that case was not brought under the original jurisdiction, but defendant Hinderlider was the state engineer of Colorado, and defended his regulatory action on the ground that the rotation he used in managing the river in Colorado was authorized by a compact between Colorado and New Mexico. The opinion is an important pronouncement on the law of interstate streams. To begin with, the Court ruled that equitable stream apportionment between states may be accomplished by compact as well as by judgment. In doing so, the Court noted that use of the rule of prior appropriation in the Wyoming case was due to the fact that both states followed that rule, and it did not preclude the use of a different approach in other cases, such as the rotation agreed upon in the Colorado-New Mexico compact. Most important, the Court held that even private Colorado rights which had vested before the compact were subject to the compact. Colorado's share of the stream was determined by the compact, and the total of all Colorado's rights could not exceed that share. Accordingly, the early priority date of the plaintiff's appropriation was unavailing to the extent that it conflicted with the management system agreed upon between the states.

In 1943, the Court decided the second Arkansas River case, this time involving a suit brought by the State of Colorado to bar a group of Kansas citizens from prosecuting actions against water users in Colorado to adjudicate their respective rights to Arkansas River water. *Colorado v. Kansas*, 320 U.S. 383, 88 L.Ed. 116, 64 S.Ct. 176 (1943). Colorado sought a decree "that Kansas and her citizens be enjoined from litigating, or attempting to litigate, the relative rights of the two states *and their citizens*. . . . " 320 U.S. at 388, emphasis added. Colorado alleged that "no proper settlement of the relative rights of the States can be obtained in suits by Kansas appropriators and against Colorado appropriators." *Id*. The Court once again found, as it had in 1907, that Colorado was not taking more than its reasonable share and granted the injunction. But the Court also strongly urged the two states to seek a more permanent allocation through an interstate compact. The present Arkansas River Compact is expressly based on the decision in that case. Compact, Art. II.

In the latter half of this century there has been some development of the Court's attitude toward the coupling of private claims with those of a state suing as quasi-sovereign. Thus, in *Maryland v. Louisiana*, 451 U.S. 725, 68 L.Ed.2d 576, 101 S.Ct. 2114 (1981), a divided Court adopted a more favorable approach toward allowing a state to represent its citizens under that doctrine. There, Maryland and several other states challenged the constitutionality of Louisiana's "first-use" tax on natural gas, and also sought recovery of the taxes already paid. *Id*. at 728, 734. The complaint estimated the direct injuries to the plaintiff states at $1.5 million, and to their citizen

consumers of gas at $120 million. 451 U.S. at 736, note 12. Among other things, the Court said:

> "Jurisdiction is also supported by the States' interest as parens patriae. A State is not permitted to enter a controversy as a nominal party in order to forward the claims of individual citizens. See Oklahoma ex rel. Johnson v. Cook, 304 U.S. 387, 82 L.Ed. 1416, 58 S.Ct. 954 (1938); New Hampshire v. Louisiana, 108 U.S. 76, 27 L.Ed. 656, 2 S.Ct. 176 (1883). But it may act as the representative of its citizens in original actions where the injury alleged affects the general population of a State in a substantial way. See, e.g., Missouri v. Illinois, 180 U.S. 208, 45 L.Ed. 497, 21 S.Ct. 331 (1901); Kansas v. Colorado, 185 U.S. 125, 46 L.Ed. 838, 22 S.Ct. 552 (1902); Georgia v. Tennessee Copper Co., 206 U.S. 230, 51 L.Ed. 1038, 27 S.Ct. 618, (1907)." 451 U.S. at 737.

With respect to the claim for injuries suffered by individual consumers, the Court stated:

> "As the Special Master observed, individual consumers cannot be expected to litigate the validity of the First-Use Tax given that the amounts paid by each consumer are likely to be relatively small. Moreover, because the consumers are not directly responsible to Louisiana for payment of the taxes, they of course are foreclosed from suing for a refund in Louisiana's courts. In such circumstances, exercise of our original jurisdiction is proper." 451 U.S. at 739.

C. The Compact.

One of the stated purposes of the Arkansas River Compact is to settle controversies not only between the states, but also "between citizens of one and citizens of the other State." Compact, Art. I-A. The compact also defines the term "state" to include any person claiming rights to the Arkansas River under the authority of that state. Compact, Art. VII-A. In an interstate controversy a state has the power to represent the water claims of its people, and an interstate compact is binding upon the water users within a state. *Hinderlider v. La Plata River & Cherry Creek Ditch Co.*, 304 U.S. 92, 106, 82 L.Ed. 1202, 58 S.Ct. 803 (1938), *Wyoming v. Colorado*, 286 U.S. 494, 508-09, 76 L.Ed. 1245, 52 S.Ct. 621 (1932).

Thus, Kansas contends that under the compact a state and its citizens are treated as one. Kan. Reply Brief at 22. An injury to its people is an injury to the state. Kan. Brief re Statement of Position at 12. In the Laramie River disputes the Court observed that "the interests of the state are indissolubly linked with the rights of the appropriators" [i.e., the water use claimants in both states]. *Wyoming v. Colorado*, 259 U.S. 419, 468, 66 L.Ed. 999, 42 S.Ct. 552 (1922). And against a claim that certain individual water users were not bound by the decree because they were not parties to the suit, the Court stated:

> "In this the nature of the suit is misconceived. It was one between States, each acting as a quasi-sovereign and representative of the interests and rights of her people in a controversy with the other . . . Decisions in other cases also warrant the conclusion that the water claimants in Colorado, and those in Wyoming, were represented

by their respective States and are bound by the decree." *Wyoming v. Colorado*, 286 U.S. 494, 508-09, 76 L.Ed. 1245, 52 S.Ct. 621 (1932).

Colorado voices concern that an overly broad interpretation of quasi-sovereignty could create the potential for double recovery. RT Vol. 169 at 55-56. That should not be a problem here, however. The Arkansas River Compact allows each state to represent its water users, and to bind them. If losses suffered by Kansas water users are included in any damages awarded to the State of Kansas, such a judgment should seal off any later recovery attempts by individual water users. Moreover, there is a substantial question whether Kansas water users have any forum open to them, apart from the compact. In 1943 Colorado was able to enjoin the prosecution of individual water rights litigation over the use of Arkansas River water. *Colorado v. Kansas*, 320 U.S. 383, 88 L.Ed. 116, 64 S.Ct. 176 (1943). During oral argument on the draft of this Second Report, counsel for Colorado acknowledged that his view of the Eleventh Amendment, together with the prior litigation, led to the conclusion that "Kansas water users do not have a remedy"; that there is "no way" to recover their losses. RT Vol. 169 at 56-57.

D. Conclusion.

For several reasons, I believe the Court should reject Colorado's present argument that the amount of damages to be awarded to Kansas may not take into account evidence of injuries to its water users.

First, Colorado's argument is inconsistent with the basic concept of quasi-sovereignty. When the conduct of

one state toward the citizens of another state is general enough and substantial enough to call for responsive action by the second state, it is unrealistic and unfair to say that the tribunal assigned to resolve the conflict must do so without evidence of the injuries suffered by those interests which are directly affected. Quasi-sovereignty (a recognized exception under the 11th Amendment) operates to avoid such a result. It throws the mantle of the state itself over the area and people involved in order to permit a general recovery for them, albeit the recovery is payable to the state itself. So long as the suit is not a subterfuge for recovery by individuals on their individual claims, quasi-sovereignty militates against rejection of any relevant evidence of injury.

Second, the key case on this subject, *Texas v. New Mexico*, 482 U.S. 124, 96 L.Ed.2d 105, 107 S.Ct. 2279 (1987), speaks broadly of providing a remedy for past breaches. The exclusion of any otherwise admissible evidence of injury would do violence to that approach. I rely on these statements by the Court:

> "We find no merit in [New Mexico's] submission that we may order only prospective relief, that is, requiring future performance of compact obligations without a remedy for past breaches. If that were the case, New Mexico's defaults could never be remedied." 482 U.S. at 128.

> "There is nothing in the nature of compacts generally or of this Compact in particular that counsels against rectifying a failure to perform in the past as well as ordering future performance called for by the Compact. By ratifying the Constitution, the States gave this Court complete judicial power to adjudicate disputes

among them, Rhode Island v. Massachusetts, 12 Pet. 657, 720, 9 L.Ed. 1233 (1838), and this power includes the capacity to provide one State a remedy for the breach of another." 482 U.S. at 128.

"[The] lack of specific provision for a remedy in case of breach does not, in our view, mandate repayment in water and preclude damages. Nor does our opinion in 462 U.S. 554, 77 L.Ed.2d 1, 103 S.Ct. 2558 (1983), necessarily foreclose such relief. There, we asserted our authority in this original action to resolve the case judicially, rather than by restructuring the administrative mechanism established by the Compact. That authority extended to devising a method by which New Mexico's obligation could be ascertained and then quantifying New Mexico's past obligation, as the Master has now done. We have now agreed with him that New Mexico has not fully performed, and we are quite sure that the Compact itself does not prevent our ordering a *suitable* remedy, whether in water or money." 482 U.S. at 130, emphasis added.

"The Court has recognized the propriety of money judgments against a State in an original action, and specifically in a case involving a compact. In *proper original actions, the Eleventh Amendment is no barrier, for by its terms, it applies only to suits by citizens against a State.*" 482 U.S. at 130, emphasis added.

Against the background of the evidence in *Texas v. New Mexico*, which found a shortfall to Texas farmers of 340,100 acre-feet, the Court's 11th Amendment statement is certainly persuasive, and to Kansas it is dispositive. It must be acknowledged, however, that this case dealt with

the question of whether any money damages could be awarded at all, and not how they might be determined.

Third, as above noted, in the Laramie River decisions the Court has already used evidence of individual claims as the basis for an interstate apportionment of water. I see no meaningful distinction between the water right claims of the *Wyoming* cases, and looking to the entitlements of individual ditches and water users in Kansas, and the shortfalls thereto, in determining the damages of the state.

Finally, in the case at hand, the State of Kansas is the signatory to the Arkansas River Compact, and the only party that can sue to protect the Stateline flows guaranteed for use by Kansas water users. The states were urged by this Court to settle their differences by compact, which they did. If a money remedy is awarded for past compact violations, the damages should include all losses that have occurred as a result of such violations, including those suffered by individual water users, subject only to the overriding consideration that the remedy must finally be a "fair and equitable solution." *Texas v. New Mexico*, 482 U.S. 124, 134, 96 L.Ed.2d 105, 107 S.Ct. 2279 (1987). The State of Kansas would be a feeble representative if it were otherwise constrained.

The fundamental rule which I see at the heart of this entire subject is that if the Court accepts a case between states as one involving sovereignty or quasi-sovereignty, it is then regarded, in law, strictly as state litigation, and the 11th Amendment is not a factor. (See *Maryland v. Louisiana*, 451 U.S. 725, 745, 68 L.Ed.2d 576, 101 S.Ct. 2114 (1981), note 21.) To adopt the Colorado view is essentially

to allow the Eleventh Amendment to limit the "complete judicial power" given this Court to adjudicate disputes among the states. *Texas v. New Mexico, supra* at 128. The Court's original jurisdiction is a substitute for the treaty and war powers which the states surrendered when they ratified the Constitution. *Rhode Island v. Massachusetts*, 37 U.S. (12 Pet.) 657, 725, 9 L.Ed.1233 (1838); *Kansas v. Colorado*, 185 U.S. 125, 140, 46 L.Ed. 838, 22 S.Ct. 552 (1902); *North Dakota v. Minnesota*, 263 U.S. 365, 372-73, 68 L.Ed. 342, 44 S.Ct. 138 (1923). I do not believe that the Eleventh Amendment was intended to curtail this unprecedented grant of judicial power to fully adjudicate a dispute between states over the enforcement of an interstate compact.

APPENDIX – Exhibit 4

Section XV of Second Report (Prejudgment Interest)

SECTION XV

PREJUDGMENT INTEREST

In their general briefing on remedies, the states have also addressed the issue of prejudgment interest. In view of the statement in *Texas v. New Mexico*, the entitlement to post-judgment interest on any money award is apparently not in issue.[1] 482 U.S. 124, 131 n.8, 96 L.Ed.2d 105, 107 S.Ct. 2279 (1987).

Kansas argues, however, that an award of prejudgment interest is appropriate for the purpose of providing complete compensation for the injuries it has suffered as a result of Colorado's breach of the compact, whether the form of remedy is in money or water. In Kansas' view, the remedy must be in "present value terms." Kan. Brief re Statement of Position at 15. Colorado opposes such an award on equitable grounds, namely, the existence of a good faith dispute over compact compliance, the absence

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[1] In *Texas v. New Mexico*, the Special Master found an accumulated shortfall of 340,100 acre-feet, which he recommended be made up over 10 years at 34,010 acre-feet annually, together with "water interest" for any bad faith failure to deliver. 482 U.S. at 127-28. The Court noted that in the event of a water remedy, Texas would be entitled "to some form of post judgment interest for the period during which that judgment is not satisfied." *Id.* at 132, n.8. However, the Court added: "We are unpersuaded, however, that 'water interest,' rather than money, should be awarded unless and until it proves to be necessary." *Id.* Colorado states that if repayment in water is recommended, post-judgment interest would be necessary only if the water was not delivered as ordered by the Court. Colo. Reply Brief at 27. Kansas strongly disagrees since delivery of make-up water would probably have to extend over a number of years.

of any compact provisions requiring the payment of money, and because the amount of any damages is not readily ascertainable, that is, damages are unliquidated. Colo. Reply Brief at 26-33.

In essence, Colorado argues in favor of the traditional approach to prejudgment interest which allowed – and, in some jurisdictions still allows – an award of prejudgment interest *only* on a liquidated claim or a strictly construed statute. *See, e.g., Montsopoulos v. American Mut. Ins. Co.*, 607 F.2d 1185, 1190 (7th Cir. 1979), interpreting Wisconsin law; *Clements Auto Co. v. Service Bureau Corp.*, 444 F.2d 169, 189 (8th Cir. 1971), interpreting Minnesota law; *Tenneco Oil Co. v. Gaffney*, 369 F.2d 306 (10th Cir. 1966), applying Wyoming law.

The rationale underlying the distinction between liquidated and unliquidated damages, for the purpose of awarding prejudgment interest, is that the defendant should not have to pay interest on damages that cannot be readily ascertained before judgment. By the nature of the dispute, the defendant is unable to halt the accrual of interest by making payment. Rothschild, *Prejudgment Interest: Survey and Suggestion*, 77 Nw U.L. Rev. 192, 197; D.Dobbs, *Law of Remedies* § 3.6(3) (2nd Ed. 1993).

This rationale, however, "has faced trenchant criticism for a number of years." *City of Milwaukee v. Cement Div., National Gypsum Co.*, 515 U.S. 189, 132 L.Ed.2d 148, 156, 115 S.Ct. 2091 (1995). Moreover, courts have recognized that an award of prejudgment interest *is* appropriate in order to provide complete compensation. *General Motors Corp. v. Devex Corp.* 461 U.S. 648, 655-656, 76 L.Ed.2d 211, 218, 103 S.Ct. 2058 (1983); *Funkhouser v. J.B.*

Preston Co., 290 U.S. 163, 168, 78 L.Ed. 243, 246, 54 S.Ct. 134 (1933); *Miller v. Robertson*, 266 U.S. 243, 257-58, 69 L.Ed. 265, 45 S.Ct. 73 (1924); *Davis Cattle Co. v. Great Western Sugar Co.*, 393 F.Supp. 1165, 1187, 1192-94 (D.Colo. 1975) (applying Colorado law), aff'd, 544 F.2d 436, 441-42 (10th Cir. 1976), cert. den., 429 U.S. 1094 (1977). Further, courts have determined that prejudgment interest may be necessary to avoid unjust enrichment of a defendant who has had the use of money or things which rightly belong to the plaintiff. *Martinez v. Continental Enterprises*, 730 P.2d (Colo. 1986). They have also recognized in some instances that, if prejudgment interest is not awarded, the defendant may have an incentive to delay payment. D. Dobbs, *Law of Remedies, supra*, § 3.6(3) and cases cited.

As a consequence, a majority of jurisdictions reject the strict, traditional approach to awarding prejudgment interest. (Rothschild, *Prejudgment Interest: Survey and Suggestion, supra*, p. 204) As early as 1933, for example, the Supreme Court stated:

> "It has been recognized that a distinction, in this respect, simply as between cases of liquidated and unliquidated damages, is not a sound one. Whether the case is of the one class or the other, the injured party has suffered a loss which may be regarded as not fully compensated if he is confined to the amount found to be recoverable as of the time of the breach and nothing is added for the delay in obtaining the award of damages. Because of this fact, the rule with respect to unliquidated damages has been in evolution, and in the absence of legislation the courts have dealt with the question of allowing

> interest according to their conception of the demands of justice and practicality." *Funkhouser v. J.B. Preston Co., supra,* 290 U.S. at 163, 168-169, 78 L.Ed. 243, 54 S.Ct. 134 (1933), citations omitted.

Although it may be only dictum, and also an admiralty case, the Court's decision in *City of Milwaukee v. Cement Division, National Gypsum Co.*, 515 U.S. 189, 132 L.Ed.2d 148, 115 S.Ct. 2091 (1995) is so recent and pointed that it must strongly influence the prejudgment interest issues. At the outset, it should be acknowledged that the case involves a maritime collision under admiralty law. The general rule in such cases has been long established that prejudgment interest should be awarded, subject only to a limited exception for "peculiar" or "exceptional" circumstances. 132 L.Ed.2d at 154. The district court in this case found such unusual circumstances. It determined that the plaintiff bore 96 percent of the responsibility for the disaster, while the City of Milwaukee bore only 4 percent of the fault, and ruled that it would have been inequitable to award prejudgment interest in light of the magnitude of plaintiff's contributory negligence. The court of appeals made its own analysis of the record and changed the apportionment of liability to two-thirds to National Gypsum and one-third to the City. It also reversed the judgment, which the Supreme Court affirmed in a unanimous decision by Justice Stevens (Justice Breyer took no part in the decision).

After appropriate apportionment, the City's one-third share of damages owed to National Gypsum was

$1.677 million, but National Gypsum also sought prejudgment interest in the sum of $5.3 million.[2] In upholding an award of prejudgment interest, the Court dismissed the City's argument of a good faith dispute over its liability as having "little weight." 132 L.Ed.2d at 155. The Court was also "unmoved" by the City's contention that an award of prejudgment interest is inequitable in a mutual fault situation. *Id.* at 157. Indeed, since liability had already been apportioned, the Court stated that a "*denial* of prejudgment interest would be unfair." *Id.* "The essential rationale for awarding prejudgment interest is to ensure that an injured party is fully compensated for its loss." *Id.* at 155.

The Court also discussed the liquidated/unliquidated damage issue, noting that the distinction had never become "so firmly entrenched in admiralty as it has been at law," and indeed has faced "trenchant criticism for a number of years." *Id.* at 156. Nearly 65 years ago the Court remarked that the rule with respect to unliquidated damages "has been in evolution." *Funkhouser v. J.B. Preston, supra,* 290 U.S. at 168-69. And while the conceptual differences have not been completely reconciled outside of the admiralty context,[3] the trend of the evolution is clear: the compensatory rationale for prejudgment interest has emerged as the dominant principle. Prejudgment

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[2] The Court did not pass on the methodology used to calculate prejudgment interest, nor upon the rate to be applied.

[3] See, for example, *Blau v. Lehman*, 368 U.S. 403, 7 L.Ed.2d 403, 82 S.Ct. 451 (1962) where prejudgment interest on unliquidated damages was denied, and *Jackson County v. United States*, 308 U.S. 343, 84 L.Ed. 313, 60 S.Ct. 285 (1939) where prejudgment interest was denied on grounds of fairness.

interest will be allowed in a majority of jurisdictions irrespective of whether the obligation underlying such interest is liquidated. Rothschild, *Prejudgment Interest: Survey and Suggestion, supra.* The Court's recent decision in *City of Milwaukee* strongly suggests that the kinds of objections to prejudgment interest raised by Colorado are now obsolete.

Kansas' claim for damages in this case certainly represents an unliquidated claim. Determining the amount of depletions to usable Stateline flow has required an extensive trial. And determining the money damages as a result of the shortfall, if that should be the remedy, has yet to be tried. However, I have concluded that the unliquidated nature of Kansas' money damages does not, in and of itself, bar an award of prejudgment interest.[4]

That is not to say, however, that Kansas is necessarily entitled to prejudgment interest on any award of money damages or remedy requiring additional water to make up the shortfall. Even in admiralty cases "such an award has never been automatic." *City of Milwaukee,* 132 L.Ed.2d at 155. Allowance of interest on damages "is not an absolute right," and whether prejudgment interest ought or ought not to be allowed rests "very much in the discretion of the tribunal which has to pass upon the subject . . . " *Id.* Interest is not recoverable "according to a

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[4] "Any fixed rule allowing prejudgment interest only on liquidated claims would be difficult if not impossible to reconcile with admiralty's traditional presumption. Yet unless we were willing to adopt such a rule – which we are not – uncertainty about the outcome of a case should not preclude an award of interest." *City of Milwaukee,* 132 L.Ed.2d at 156.

rigid theory of compensation for money withheld, but is given in response to considerations of fairness." *Jackson County v. United States,* 308 U.S. 343, 352, 84 L.Ed. 313, 60 S.Ct. 295 (1939). The Court in *City of Milwaukee* stated that it had never attempted "to exhaustively catalogue the circumstances that will justify the denial of interest," but noted that "the most obvious example" would be the plaintiff's responsibility for undue delay in prosecuting the lawsuit, citing *General Motors Corp v. Devex Corp.,* 461 U.S. 648, 657, 76 L.Ed.2d 211, 103 S.Ct. 2058 (1983). *City of Milwaukee,* 132 L.Ed.2d at 155. The Court also added: "Other circumstances may appropriately be invoked as warranted by the facts of particular cases." *Id.*

In the case at hand, depletions of usable Stateline flows in violation of the compact reach back to 1950, and Kansas seeks relief, preferably in money damages, for the total amount of the shortfall since 1950. The Court has already ruled that Kansas was not guilty of laches in bringing this action, but nonetheless Kansas did not seek to file its complaint until the end of 1985. The parties then took almost five years in preparing for trial which began in September of 1990. Whether any of the circumstances and developments that have occurred since 1950 may be considered in assessing the appropriateness of prejudgment interest should be a matter of argument and proof in future proceedings of the remedies phase of this case. Much like *Jackson County v. United States,* we are without "roots in history" in approaching the issue of damages and prejudgment interest in a case of this kind. 308 U.S. at 351, *supra.*

APPENDIX – Exhibit 5

Order dated January 11, 1999
re Modeling and Other Issues

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant, UNITED STATES OF AMERICA, Intervenor.	)	No. 105 Original October Term, 1998

ORDER RE STATELINE DEPLETIONS FOR 1995-96

(Filed Jan. 11, 1999)

Following the Supreme Court's approval of my First Report on liability issues, the states stipulated to depletions to usable Stateline flow for the period 1950-85 in the amount of 328,505 acre-feet. October 30, 1995 Stipulation. Thereafter, additional trial segments totaling 26 days were held concerning depletions for the period 1986-94. In my Second Report, filed in September 1997, I recommended to the Court that depletions to usable Stateline flow for the 1986-94 period be determined to be 91,565 acre-feet. No exceptions to this determination were taken by either state. The trial then proceeded to consider compact compliance for the period 1995-96.

The 1996 Use Rules adopted by Colorado became effective on June 1, 1996, and thus were applicable only to the last seven months of the 1995-96 period. Moreover, during this first partial year of operation, the Rules called for the replacement of only 60 percent of the out-of-priority depletions in Colorado. The Use Rules provided that Stateline depletions were to be determined through

use of the H-I model, employing the Durbin usable flow analysis with the Larson coefficients.

Mr. Schroeder undertook the task of updating the H-I model with appropriate new data, and with the changes necessary to represent the replacement programs then under way in Colorado. RT Vol. 175 at 9, 15. His results were presented to Kansas on October 27, 1997. Certain of the changes and new data which he had included in the model were accepted by the Kansas experts, and certain additional changes were made at Kansas' request. But at the conclusion of those meetings, certain disagreements still remained over how to model the 1995-96 period. RT Vol. 173 at 19.

Trial resumed on May 11, 1998 to consider compact compliance for 1995-96, and the modeling differences which then existed. Initially, the Kansas evidence showed Stateline depletions of usable flow in the amount of 8368 acre-feet for 1995-96. Kan. Exh. 862. The comparable Colorado figure was 6597 acre-feet. Colo. Exh. 1064; RT Vol. 173 at 34. During this trial segment, however, experts for both states indicated that these amounts needed to be revised as a result of further discussions and additional new data. These revisions were submitted to me later in the form of Jt. Exh. 182. Kansas now claims depletions of 8196 acre-feet. Colorado's model results show 6717 acre-feet. Both states also briefed the modeling issues that lead to these different results. This Order decides those issues.

A. TRANSIT LOSSES FOR TRANSMOUNTAIN WATER.

The version of the H-I model used to estimate depletions for 1986-94 was structured so that transit losses resulting from transmountain water were not available for diversion. Such losses return to the river, but were passed directly to John Martin Reservoir or the Stateline. The model did not allow those losses to be diverted by any of the canal companies. Colo. Exh. 1064 at 3; RT Vol. 174 at 27; RT Vol. 175 at 36. Mr. Schroeder had always believed that this treatment of transit losses was "improper." RT Vol. 173 at 20, 90; Colo. Exh. 1064 at 3. And the Kansas experts came to agree to the extent that a "correction" was needed. RT Vol. 175 at 36; RT Vol. 175 at 123.

In determining depletions for 1995-96, Kansas therefore changed the H-I model in regard to transit losses. RT Vol. 175 at 36. Kansas experts treated 10% of transit losses from transmountain water as consumptive, but allowed the remaining 90% to be available for diversion by the next canal company in priority. RT 173 at 91. Colorado, on the other hand, did not make such a change when it ran the model for 1995-96 depletions. This was not a situation where the Colorado experts thought that a change was unneeded, or that the Kansas change did not improve the model's representation of the system. Rather, Mr. Schroeder believed that his assignment was to update the 1986-94 version of the model, to insert the new data, and to represent the replacement plans. RT Vol. 174 at 20-22, 24. He did not understand that model deficiencies in the 1986-94 version were to be addressed. RT Vol. 174 at 24.

The impact of making this change is to increase Stateline depletions for 1995-96 by approximately 617 acre-feet.

Experts for both states are in essential agreement that this is a change that should be made. RT Vol. 173 at 91; RT Vol. 174 at 20. Moreover, Kansas experts concluded that such a change alone would not require the H-I model to be recalibrated. RT Vol. 175 at 37, 126; Kan. Exh. 865, 866. Schroeder concurred that this change would not make much difference. RT Vol. 174 at 27-28. His concern, however, is that more needs to be done, both with respect to transit losses as well as other changes "to better represent the system." RT Vol. 174 at 20-22, 27. Schroeder has consistently objected to the model's use of diversion reduction and WANT factors, but his prior efforts to eliminate these parameters have not been successful. Kansas experts agree that it would be better to remove these factors if the model could be calibrated as well without them. RT Vol. 175 at 139. However, until better data is available, it is the Kansas view that such artificial parameters must remain.

Under the circumstances, and in determining 1995-96 depletions, I find that the Kansas change in the treatment of transit losses from transmountain water should be made. I count on the experts from both states to continue to make such changes as will improve the accuracy of the H-I model, without regard to whether those changes will increase or decrease calculated depletions.

B. ACREAGE IRRIGATED BY BOTH SURFACE WATER AND SUPPLEMENTAL WELLS.

The H-I model assigns an amount of acreage in each canal service area that has access to groundwater. Initially, the model included just two categories; that is, acreage supplied with surface water only, and acreage having access to both surface and well water. In determining depletions for 1995 and 1996, a new acreage category was established for lands irrigated by well water only, referred to as "sole source" acreage. RT Vol. 174 at 101. The states agreed upon the amounts of sole source acreage. Colo. Exh. 1064 at 1; Kan. Exh. 862 at 3-4. Experts for the parties, however, were unable to agree upon the remaining acreage that had access to both surface and supplemental well water.

The Kansas estimates are shown in Table 1 of Kansas Exhibit 862. These values are consistent with the percentages that have been used previously in the H-I model, including the version used to determine depletions for 1986-94. RT Vol. 173 at 115; RT Vol. 174 at 101. Mr. Schroeder concluded, however, that these values should be changed in the model runs used for 1995 and 1996 compliance. The percentages which he used are shown in Colorado Exhibit 1064 at 5, together with a comparison of the Kansas percentages. Totaling the acreage in all canal service areas, Kansas determined that 163,000 acres were serviced by a combination of surface and groundwater, while the comparable Colorado figure was 147,000 acres. RT Vol. 174 at 102. The impact of the Colorado changes is to reduce depletions of usable Stateline flow for the years

1995 and 1996 by approximately 483 acre-feet. Jt. Exh. 182.

Recently, Colorado has developed a considerable amount of new data on wells, showing that the number of sole source wells is greater than previously understood; moreover, that the number of active wells in 1996 was substantially less than the total number of wells. RT Vol. 175 at 57; Colo. Exh. 1052. Mr. Schroeder testified that the new information showing more sole source pumping makes it "very apparent" that the original values used by Kansas are inappropriate. RT Vol. 173 at 115. For example, he pointed to the Bessemer Canal, which now shows 2605 sole source acreage out of a total of 19,130 acres. Colo. Exh. 1064 at 5; RT Vol. 173 at 115, 119-20. However, removal of the sole source acreage does not necessarily indicate the percentage of the remaining acreage that still receives both surface and groundwater. Indeed, Schroeder did not correlate the two. RT Vol. 173 at 119-20, 122. With respect to the Bessemer Canal, he simply concluded, on the basis of the permits and decrees that were reviewed, that the Colorado study was superior; that the 57% figure applied by Colorado to indicate remaining acreage receiving supplemental groundwater was more accurate than the 100% figure in the H-I model. RT Vol. 173 at 120, 122.

Based upon his belief that the H-I model thus overestimated the amount of acreage receiving supplemental water, he changed the percentage values to correspond with data developed by Colorado in 1990 for use in its Water Budget Model. RT Vol. 173 at 117-18; RT Vol. 174 at 100. The specific percentages used by Mr. Schroeder are shown in Colo. Exhibit 1064 at 5. There is nothing to

show, however, that the 1990 percentages used by Mr. Schroeder are more accurate than those included in the H-I model. The evidence on this point does not support Mr. Schroeder's changes as much as it underscores the need for better data. That process is under way and is expected to be completed in 1998.

Mr. Schroeder acknowledged that this is "still an area that will need some work, and hopefully we will improve it." RT Vol. 173 at 123. Mr. Book also supported the need for improvements, particularly in the collection of field information on acreage irrigated by wells. RT Vol. 175 at 58. He understood that this was being pursued, referring to the testimony of Bill W. Tyner.

Mr. Tyner is a registered professional engineer, employed by the Colorado Division of Water Resources as the groundwater use work group leader. RT Vol. 176 at 88. He testified to the work his group had been doing to estimate the acreage irrigated by active wells in 1995 and 1996. RT Vol. 176 at 92. This included updating the various permits and decrees which Colorado had used in its 1990 Water Budget to determine acreage irrigated by wells. At the time of his testimony, no field work had been done, but this was contemplated as part of Colorado's ongoing effort to collect data concerning sole source and supplemental well acreage. RT Vol. 176 at 104. Farmer surveys had been called for, and were to be followed up with some field verifications. RT Vol. 176 at 95. Also, his group was updating the 1985 aerial photography with satellite imagery "that will allow us to determine more accurately all acreage values." RT Vol. 176 at 96. He expected that this work would be done during 1998, allowing Colorado to do "a very good job" of

identifying acreage served only by wells, and acreage served by both wells and surface water. RT Vol. 176 at 108-09. It is significant in deciding this issue that Mr. Schroeder did not include any of the work done by Mr. Tyner, but simply went back to Colorado's 1990 data. RT Vol. 176 at 117.

I conclude, therefore, that in determining depletions for 1995 and 1996, that the acreage receiving supplemental groundwater should be represented in the H-I model by using the same percentages approved for 1986-94. This may, however, be a subject for review when Mr. Tyner's work is completed.

C. RELEASES TO THE STATELINE.

In determining depletions for 1995-96, the states were also in disagreement over the amount of replacement water for which Colorado should receive credit. Colorado claimed credit at the Stateline for 3682 acre-feet; Kansas' analysis reduced this credit to 3068 acre-feet. Kan. Exh. 862 at 9; Kan. Exh. 864 at 3. The impact of the Kansas calculation is to increase depletions of usable flow by approximately 268 acre-feet. Jt. Exh. 182.

During five days in April and three days in May, 1996 Colorado delivered replacement water to the Stateline at the same time that Kansas called for releases from its Article II account in John Martin Reservoir. Article II water belongs to Kansas under the 1980 Operating Plan, and is released on its call, together with additional flows to offset the transit losses between the reservoir and the Stateline. The issue between the states involves an

accounting disagreement over the allocation of actual Stateline flows between Colorado's replacement deliveries and Kansas' Article II water.

Kansas expert, Dale Book, prepared a daily analysis of Stateline flows for the months of April, May and June, 1996. Kan. Exh. 1064. The purpose of his study was to determine how much of the replacement water released to the river by Colorado actually reached the Stateline. RT Vol. 174 at 129-30; Kan. Exh. 864. Book acknowledged that this effort could "get very complicated." RT Vol. 174 at 123. Nonetheless, in all but seven days during this three-month period, the states agree upon the credits to which Colorado is entitled. However, during the several days when both replacement and Article II waters were present at the Stateline, Book credited the flows first to the delivery of Kansas' Article II water, and then credited any excess to Colorado as replacement water. RT Vol. 175 at 161, 166. This reduced the total credits claimed by Colorado by some 614 acre-feet. Colorado, on the other hand, took the opposite approach, allocating Stateline flows first to replacement water and then the remainder to Article II deliveries.

Colorado's witness, Steven Witte, testified to an annual agreement with Kansas which allowed "some flexibility" in the delivery of Article II water, so that deliveries would be accomplished "over the period of a run" and not necessarily on a day-to-day basis. RT Vol. 176 at 12-13. In his judgment, Colorado's approach thus allowed full credit to Colorado for delivery of its replacement water, while still providing Kansas with all of its Article II deliveries, though perhaps not on a daily basis. RT Vol. 176 at 14, 20-21. Kansas argued, based upon its

daily flow analysis, that Colorado's methodology allowed Colorado to claim credit for water released to Kansas from its Article II account. But Kansas did not demonstrate that over time it was denied the full measure of its Article II releases. I conclude, therefore, that for 1995-96 Colorado is entitled to replacement water credit at the Stateline in the amount of 3682 acre-feet.

Fortunately, this issue is not likely to arise again. In 1997 the Offset Account was established in John Martin Reservoir. Colorado can now deliver replacement water into this account, to be released at Kansas' call. Kansas thus has two separate accounts at its disposal in John Martin Reservoir – its Article II water, and now also replacement water made available by Colorado. Testimony shows that Kansas identifies the particular account from which water is to be released.

D. THE X-Y CANAL.

In 1996 the Lower Arkansas Water Management Association purchased 66 cfs of the 69 cfs water right decreed to the X-Y Canal, and dried up most of its 7700-acre service area. RT Vol. 176 at 119; RT Vol. 174 at 110. Landowners holding rights to 3 cfs did not sell, and continued to irrigate about 180 acres. Kan. Exh. 862 at 7-8. However, the irrigation supply for those acres no longer came from river diversions, but rather from seepage and return flows collected in the canal. RT Vol. 176 at 120. The headgate of the canal has been plugged so that surface diversions from the river are no longer available. *Id.* Nonetheless, both the Lamar and Manvel Canals are located hydrologically upgradient of the X-Y Canal, and

apparently provide the source of the water collected and used to irrigate the 180 acres. RT Vol. 176 at 120; RT Vol. 175 at 66-67.

The issue is how to properly represent these changed conditions in the H-I model. Since the entire X-Y Canal right was not purchased, Kansas originally suggested that the portion of the right acquired (some 96%) be allowed to return to the river, while the remainder be applied to the land. RT Vol. 174 at 111. Mr. Schroeder, however, decided that it would be more appropriate to allow all of the diversion right to remain in the river, and to represent use on the 180 acres by 3 cfs of pumping. RT Vol. 173 at 87-88; RT Vol. 174 at 111; RT Vol. 177 at 39. Kansas experts do not object to the 100% credit in the river for the X-Y water, but disagree with the way in which the pumping was modeled.

Mr. Schroeder recognized 3 cfs of pumping in both runs of the model, that is, in the historic operation as well as in the compact run. RT Vol. 173 at 88; RT Vol. 174 at 111. This has the effect of treating the pumping as a precompact use. RT Vol. 173 at 88; RT Vol. 175 at 65-73. Colorado does not disagree that its model representation essentially increases the State's precompact pumping rights by 3 cfs. RT Vol. 177 at 39-41. Rather, it attempts to justify this treatment on the ground that such return flows and seepage were actually being collected and used during the precompact period. Mr. Book, however, was unwilling to concede this factual basis, and the Colorado evidence on historic use is sketchy at best. RT Vol. 177 at 40, 43-44; RT Vol. 176 at 120; RT Vol. 173 at 87-88; 129-32, 138-39. Colorado's early data also showed that the X-Y Canal was a losing ditch historically. Colo. Exh. 4* at B.24.

I do not believe, however, that it is necessary to reach the potentially difficult issues posed by Colorado's modeling of the X-Y situation; e.g., whether there was in fact precompact use equivalent to 3 cfs; whether any such use is already accounted for in the H-I model; whether any such use should be considered as a precompact pumping right; and if so, whether Colorado's precompact pumping right can be legally adjusted in view of my earlier determination and the approval of the Supreme Court. Kansas originally suggested an alternate approach, discussed briefly above. If, however, Colorado chooses to allow 100% credit for retiring the X-Y Canal right, then irrigation of the 180 acres should be represented by the pumping of a sufficient amount to provide a full supply, and that amount should be included in the historic sum of the model only. One of these two approaches should be used in operating the H-I model to estimate 1995-96 depletions.

E. SISSON WANT FACTORS.

The Sisson-Stubbs Canal is the "last ditch on the system." RT Vol. 173 at 89. Historically its facilities "frequently washed out," and the diversion dam was not replaced after the 1965 flood. Colo. Exh. 1064 at 2; RT Vol. 174 at 17, 19; RT Vol. 175 at 75. The Sisson right of 11 cfs has now been converted to two wells, as authorized alternate points of diversion. RT Vol. 176 at 121-22; RT Vol. 173 at 89. The H-I model was calibrated using a WANT factor set to "one" for Sisson. This represents about 60% of a full supply, and was based upon historical diversion records before the diversion dam was lost in

1965. RT Vol. 173 at 142-43. For Sisson, this was the WANT factor used in the model for 1986-94 depletions, and was also used by Kansas in estimating 1995-96 depletions. Mr. Schroeder acknowledged that a WANT factor of 1.0 is appropriate "if you look at the historic diversions" and that it "probably does produce, on average, a better prediction of diversion by the Sisson when it did divert back in pre-'70." RT Vol. 173 at 89, 142.

However, Mr. Schroeder believed that certain water uses did not show up in the records, that sometimes Sisson pumped directly from the river, and in the 1950s they began to rely partially on wells rather than always maintaining their diversion facilities. RT Vol. 173 at 89-90, 142-45. Based on this understanding, Mr. Schroeder increased the Sisson WANT factor to 1.7 in his use of the H-I model for 1995-96. This factor was intended to be "more or less representative of a full supply" if it were available. RT Vol. 173 at 89-90. Colorado, however, had no actual data on any amounts of water that might have been taken, but which were not recorded during the calibration period. RT Vol. 173 at 147. Nor was there evidence as to how any pumping in the 1950s was treated. Moreover, Mr. Schroeder's testimony itself was uncertain: "very possibly" more water was taken; the records "may not have reflected the total use under the Sisson; the early diversion records "probably" did not include some of the pumping that occurred at the river. RT Vol. 173 at 145-46.

Kansas prepared Exhibit 868 which compared observed diversions with those predicted by the H-I model using the existing WANT factor of 1.0, and with the Colorado change to 1.7. For the period of 1951-64, that

is, before the Sisson headgate was washed out, observed diversions averaged 628 acre-feet annually. The H-I model predicted 768 acre-feet, or 122% of the observed diversions. With the WANT factor change made by Colorado, the model predicted diversions of 1102 acre-feet, or 175% of the observed Sisson diversions.

I conclude that the evidence does not support the model change made by Colorado for Sisson in estimating 1995-96 depletions.

It should be noted that Mr. Schroeder's increase in the Sisson WANT factor was part of an earlier recommendation which I rejected. RT Vol. 174 at 14-15; Colo. Exh. 973. I am well aware that Mr. Schroeder has consistently objected to the WANT factors in the H-I model. But they are deeply imbedded in the structure of the model, and I doubt that they should be addressed on an ad hoc basis. Counsel for Colorado has suggested the need for a more comprehensive review that may have merit. RT Vol. 173 at 10-11. The function of the WANT factors in the H-I model is to determine how much water is needed by any particular ditch. In part, this depends upon the amount of acreage receiving river water. Colorado indicates that its recent work has identified significantly more sole source acreage (irrigated by wells only) than the model currently assumes. Counsel says that such sole source acreage should be deducted from the acreage that was historically assumed to have wanted river water. However, he adds that this is a task involving "more extensive time," and to be done with "Kansas' participation." RT Vol. 173 at 10.

F. WILEY/SAPP ALTERNATE POINTS OF DIVERSION.

The final dispute over the 1995-96 depletions concerns modeling for the Wiley Drain and the Sapp Ditch. Precompact surface rights have been decreed to both of these ditches. Rights in the Wiley Drain flows were decreed in 1906 with appropriation dates of 1895 and 1896. RT Vol. 175 at 86. The decree for the Sapp Ditch was entered in 1909 with an 1896 priority. RT Vol. 175 at 87. Later, wells as alternate points of diversion were decreed for both ditches. Kan. Exh. 830, Case W-4496-97 for Wiley, and Case 89CW82 for Sapp. The present issue is how to model the pumping from such wells.

The amount of pumping from these wells, and the actual impact on depletions is negligible.[1] However, Kansas fears that a precedent may be involved, and claims that Colorado's modeling of the pumping "has the potential for expanded use." Kan. Exh. 862 at 2. But neither state should be apprehensive. This is a narrow decision, limited to the evidence on a situation that may be unique.

Until this point in time, pumping from the Wiley and Sapp wells has been included in the H-I model as post-compact pumping. RT Vol. 175 at 15, 21. The Colorado Water Budget treated such pumping in the same fashion. RT Vol. 175 at 21. Recently, however, when the LAWMA plan was presented, Colorado became aware of the wells

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[1] In the last two years, pumping under the Wiley Drain rights amounted to only 9 acre-feet. RT 175 at 87. And the depletion impact for 1995-96 from both Wiley and Sapp pumping is only 7 acre-feet. Jt. Exh. 182.

as alternate points of diversion, and a request was made for such recognition. Mr. Schroeder, then, in his 1995-96 modeling excluded these amounts from post-compact pumping. RT 175 at 14-15. Mr. Simpson testified that, insofar as he is aware, the alternate points of diversion for the Wiley and Sapp ditches are the only ones that have been overlooked. RT Vol. 177 at 53.

Kansas does not object to the concept that pumping under an alternate point of diversion decree may be modeled as a surface use. RT Vol. 175 at 15. Rather, it complains that the Wiley decree in particular does not provide adequate protections against enlarging the historical surface use.[2] RT Vol. 175 at 16. Mr. Book pointed out that the Wiley decree does not limit pumping to the surface right priority. RT Vol. 175 at 20. Hence, pumping could occur when water would not have been available under the surface right, which is a "junior right." RT Vol. 177 at 66. While the Wiley decree imposes a 600 acre-feet annual limit on pumping, Book also believes that historic surface diversions did not reach that amount.[3] RT Vol. 175 at 17-18.

Yet while Book testified to the potential for abuse and expanded use under the Wiley decree, he could not show

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[2] Kansas evidence concentrates on the Wiley decree that in 1978 allowed conditional pumping. Kan. Exh. 830. The Sapp decree came later, in 1994, and contains numerous conditions, including a pumping limit of 350 acre-feet annually "allocated to the Sapp Ditch priority." Kan. Exh. 830, Finding 14(c)(d).

[3] Finding No. 8 in the Wiley decree states that during years of better flow, diversions of 6 cfs occurred for approximately 60 days, for a total of about 600 acre-feet. Kan. Exh. 830.

that such increase actually occurred. He acknowledged that he did not know what the historic surface use was. RT Vol. 175 at 21. Moreover, there was no evidence of injury from any lag effect of pumping.

I conclude, therefore, that it was proper for Colorado in modeling the 1995-96 depletions to exclude the Wiley and Sapp pumping from calculations of post-compact pumping. Hopefully, this will not be a recurring kind of issue. Book testified that not many decrees for alternate points of diversion exist, and that you can't get one anymore without showing non-injury. RT Vol. 175 at 20.

G. ORDER.

In a conference call on these modeling issues, counsel agreed that I could not use Jt. Exh. 182 to make direct adjustments to the depletion figures submitted earlier; that it would be necessary to rerun the H-I model once the modeling issues had been decided. Accordingly, I hereby direct the states to rerun the model in accordance with the decisions made herein, for the purpose of determining depletions to usable Stateline flow for the years 1995-96, and that the results be forwarded to me.

DATED: January 11, 1999

/s/ Arthur L. Littleworth
Arthur L. Littleworth
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business address is Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502.

I am readily familiar with Best, Best & Krieger's practice for collecting and processing correspondence for mailing with the United States Postal Service. Under that practice, all correspondence is deposited with the United States Postal Service the same day it is collected and processed in the ordinary course of business.

On January 11, 1999, I served the within ORDER RE STATELINE DEPLETIONS FOR 1995-96 placing a copy of the document in a separate envelope for each addressee named below and addressed to each such addressee as follows:

John B. Draper, Esq.
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Andrew F. Walch, Esq.
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General Litigation Section
999 18th Street, Suite 945
Denver, Colorado 80202

On January 11, 1999, at the office of Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502, I sealed and placed each envelope for collection and deposit by Best, Best & Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on January 11, 1999, at Riverside, California.

/s/ Sandra L. Simmons
Sandra L. Simmons

APPENDIX – Exhibit 6

Order dated July 28, 1999 re Depletions for 1995-96

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant, UNITED STATES OF AMERICA, Intervenor.	)	No. 105 Original October Term, 1998

ORDER RECOMMENDING THE AMOUNT OF DEPLETIONS OF USABLE STATELINE FLOW FOR PERIOD OF 1995-96

(Filed July 28, 1999)

On January 11, 1999 I issued an Order directing the states to rerun the H-I model, in accordance with the decisions made in such Order, to determine depletions of usable Stateline flow for the years 1995-96. That has been done, and the results have been forwarded in the form of Joint Exhibit 183.

In accordance with the results shown in Joint Exhibit 183, I hereby find that depletions of usable Stateline flow for the 1995-96 period are 7935 acre-feet, and recommend to the Supreme Court that such depletions be determined in this amount. Joint Exhibit 183 also totals depletions of usable flow for the full 1950-96 period at 428,005 acre-feet.

The 1995-96 depletions are also based in part on Joint Exhibit 182, and Joint Exhibits 182 and 183 are hereby admitted into evidence.

DATED: July 28, 1999.

/s/ Arthur L. Littleworth
ARTHUR L. LITTLEWORTH
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business address is Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502.

I am readily familiar with Best, Best & Krieger's practice for collecting and processing correspondence for mailing with the United States Postal Service. Under that practice, all correspondence is deposited with the United States Postal Service the same day it is collected and processed in the ordinary course of business.

On July 28, 1999, I served the within **ORDER RECOMMENDING THE AMOUNT OF DEPLETIONS OF USABLE STATELINE FLOW FOR THE PERIOD OF 1995-96** by placing a copy of the document in a separate

envelope for each addressee named below and addressed to each such addressee as follows:

John B. Draper, Esq.
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On July 28, 1999, at the office of Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502, I sealed and placed each envelope for collection and deposit by Best, Best & Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on July 28, 1999, at Riverside, California.

/s/ Sandra L. Simmons
Sandra L. Simmons

APPENDIX – Exhibit 7

Order dated March 22, 2000 re Mitigation of Damages,
Colo. Exh. 1096

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant, UNITED STATES OF AMERICA, Intervenor.	)	No. 105 Original October Term, 1998

ORDER RE KANSAS' OBJECTION TO EVIDENCE ON MITIGATION

(Filed March 22, 2000)

On December 15, 1999, Kansas filed a written objection to Colorado evidence related to mitigation of Kansas' damages arising from Colorado's compact violations. The objection dealt specifically with certain portions of Professor Wichelns' expert report (Colo. Exh. 1096) and his testimony on the subject. Colorado filed a written response on March 14, 2000.

In Professor Wichelns' view, a number of "opportunities" existed to mitigate damages to those lands irrigated with surface water only. Colo. Exh. 1096 at 90. Primary emphasis was on the claim that such farmers "could have mitigated their damages" by drilling wells. *Id.* at viii. Additionally, however, the report suggests that such farmers could have mitigated potential economic losses from depletions of usable Stateline flows by: (1)

participating in government set-aside programs; (2) signing a long-term contract to remove acreage from farming under the Federal Conservation Reserve Program; (3) taking out all-risk crop insurance under the Federal Crop Insurance Act of 1938; and (4) applying for federal disaster payments. Colo. Exh. 1096 at 90-104.

The doctrine of avoidable consequences, or mitigation of damages, holds that a party cannot recover damages that it could have avoided through reasonable efforts. Stated affirmatively, an aggrieved party must make reasonable efforts to lessen its damages, depending upon the circumstances of the case. *Berger v. Iron Workers Reinforced Rodmen, Local 201*, 170 F.3d 1111 (D.C.Cir. 1999); *Hidalgo Properties, Inc. v. Wachovia Mortgage Co.*, 617 F.2d 196, 200 (10th Cir. 1980). The defendant bears the burden of proving that the plaintiff failed to take reasonable steps to mitigate its damages. *Jones v. Consolidated Rail Corp.*, 800 F.2d 590, 593 (6th Cir. 1986); *Pennzoil Producing Co. v. Offshore Express, Inc.*, 943 F.2d 1465, 1475 (5th Cir. 1991) (citing *Tennessee Valley Sand & Gravel Co. v. M/V DELTA*, 598 F.2d 930, 933 (5th Cir. 1979). The duty to mitigate damages does not arise until the injured party has reason to know that a breach has occurred. *Oddi v. AYCO Corp.*, 947 F.2d 257, 264 (7th Cir. 1991); *United States v. Karlen*, 645 F.2d 635, 640 (8th Cir. 1981).

Under the circumstances of this case, Colorado has the burden of proving that Kansas did not undertake reasonable measures to mitigate its damages after the compact violations were known. Colorado acknowledges this to be the rule. Colo. Response at 3. Much of Professor Wichelns' evidence, however, focused on the opportunity,

as well as the economic advantages, of drilling supplemental wells in the 1950s and 1960s before the compact violations were known. Colo. Exh. 1096 at 93-97, Table CO-N1. I found in my First Report, and the Supreme Court affirmed, that the extent of postcompact well pumping in Colorado was not generally known until approximately 1968. First Report, at 169; *Kansas v. Colorado*, 514 U.S. 673, 688-689 (1995). Even in the 1970s, when the extent of pumping in Colorado was a matter of common knowledge, it does not necessarily mean that the impact of such pumping on usable Stateline flows was generally known or understood. First Report, at 169.

Moreover, Colorado was certainly in a position to be aware of any compact violations as early in time as Kansas. Whenever that may have occurred, Colorado also could have reduced potential damages in Kansas by compact compliance. A damage award will not be reduced on account of damages which the defendant could have avoided as easily as the plaintiff. *Buras v. Shell Oil Co.*, 666 F.Supp.919, 924-25 (S.D. Miss. 1987) (citing *Shea-S & M Ball v. Massman-Kiewit-Early*, 606 F.2d 1245, 1249 (D.C. Cir. 1979).

In its written response, Colorado agrees that Kansas' duty to mitigate did not arise prior to its knowledge of the compact violations, and Colorado puts this date at 1984. Colo. Response at 3. Colorado states that in 1984 Kansas received an engineering report which concluded that postcompact well pumping in Colorado had depleted usable Stateline flows. *Id.*, fn. 1 at 3. Colorado suggests, however, if the values of water estimated by the Kansas experts are reasonable, then allowing the construction of

additional wells "would have been a reasonable means to mitigate damages after 1984." *Id.*

With respect to the claim that Kansas farmers, at any time, should have drilled supplemental wells to irrigate those lands having access only to surface flows of the Arkansas River, I find such claim to be unreasonable. Aside from the substantial capital costs required to develop such pumping systems,[1] Kansas should not be required to further deplete its groundwater resources. Depletions of usable Stateline flows, over the 1950-94 period, have reduced groundwater recharge from the river and from canal, ditch and reservoir seepage by 224,424 acre-feet. 1998 Stipulation, Table 4B, Cols. ah, ai, aj, and 2nd Col. from right. When replacement pumping is added to these recharge losses, the total impact on Kansas groundwater is 324,866 acre-feet. 1998 Stipulation, Table 4B, last column to right. Together, the reduced groundwater recharge and the increased pumping, have resulted in lowering groundwater levels over a wide region from 0.5 feet along the perimeter to over 8.0 feet in the central part. Kan. Exh. 874 at 8, Fig. 2. These are permanent losses, both as to the loss of groundwater in storage, and as to increased pump lifts. Kan. Exh. 892, Section B at 4.

These impacts on Kansas groundwater resources go far beyond the ditch service areas of the Kansas canal

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[1] Although Colorado's expert economist, with hindsight, might demonstrate the profitability of drilling new wells, it is understandable that farmers at the time might not have had the capital available, or the willingness to assume a long term debt. Colo. Exh. 1096 at 93 *et seq.*

companies. The canals deliver surface water from the Arkansas River to about 44,000 acres, while the regional area of affected groundwater contains about 790,000 acres. 1998 Stipulation, Table 4B; Kan. Exh. 874 at 9. Pumping in the entire region, including the ditch service areas, has increased substantially over the years, from about 77,000 acre-feet in 1951 to about 718,000 acre-feet in 1988. Kan. Exh. 874 at 12. The region is severely overdrafted. A 1985 USGS study covering about 850,000 acres in Kearny and Finney Counties estimated that about 531,700 acre-feet were withdrawn from groundwater storage during the period of 1974-1980. Jt. Exh. 140 at 1, Table 1 at 37. To be sure, most of the increased pumping and overdraft results from the actions of water users in Kansas that are unrelated to river depletions caused by Colorado. Nonetheless, I do not believe that it is reasonable as a matter of law to call for still more pumping, causing further damage to Kansas and a permanent loss of more groundwater resources, in order to alleviate other damages caused by Colorado. Mitigation is not meant to result in substitute damage.

I am aware that Colorado uses evidence of potential increases in net farm income from pumping groundwater in order to argue that the values of water in the Kansas analysis are excessive. This Order is not meant to exclude evidence for that purpose. It is related only to the legal duty to mitigate.

Concerning the remaining mitigation "opportunities" cited by Professor Wichelns, I find that Colorado falls far short of meeting its burden of proof, even if some of these programs might qualify legally as appropriate mitigation measures. It is not sufficient to state that such programs

would "likely" offset farm losses. Colo. Exh. 1096 at viii, 91, 98, 102. None of the data discussed in connection with government price support programs, the conservation reserve program, crop insurance, or federal disaster payments, was directed to the lands within the canal service areas, let alone to the surface water only lands. Nor do such data and discussion show whether the surface water only lands would actually have qualified under any of the programs; or if so, what the costs and consequences might have been; or what amounts might have been recovered to offset any damages incurred by virtue of the depletions.

Accordingly, I find that it is not reasonable as a matter of law to require Kansas to mitigate its loss of surface flows from the Arkansas River by additional well pumping, and that the remaining mitigation measures proposed are too speculative to be considered. The Kansas objection is sustained, and the specific portions of Colo. Exh. 1096 identified in the Kansas motion are stricken, together with any testimony of Professor Wichelns in support thereof.

DATED: March 22, 2000

/s/ Arthur L. Littleworth
ARTHUR L. LITTLEWORTH
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years

and not a party to the within entitled action; my business address is Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502.

I am readily familiar with Best, Best & Krieger's practice for collecting and processing correspondence for mailing with the United States Postal Service. Under that practice, all correspondence is deposited with the United States Postal Service the same day it is collected and processed in the ordinary course of business.

On March 22, 2000, I served the within **ORDER RE KANSAS' OBJECTION TO EVIDENCE ON MITIGATION** by placing a copy of the document in a separate envelope for each addressee named below and addressed to each such addressee as follows:

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On March 22, 2000, at the office of Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502, I sealed and placed each envelope for collection and deposit by Best, Best & Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on March 22, 2000, at Riverside, California.

/s/ Sandra L. Simmons
Sandra L. Simmons

APPENDIX – Exhibit 8

Order dated May 1, 2000 re Objection to
Expert Testimony
(*Daubert* Motion)

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant, UNITED STATES OF AMERICA, Intervenor.	)	No. 105 Original October Term, 1999

ORDER OVERRULING COLORADO'S OBJECTION TO THE ADMISSIBILITY OF EXPERT TESTIMONY REGARDING SECONDARY ECONOMIC DAMAGES

(Filed May 1, 2000)

The Kansas claim for damages includes secondary or indirect economic losses to the Kansas economy resulting from the increased costs of pumping and crop production losses. Kansas employed two widely recognized experts, Professor Joel R. Hamilton and Dr. M. Henry Robison, to estimate these secondary economic damages. At the conclusion of the cross-examination of these experts, Colorado made an objection to the admissibility of all testimony concerning the analysis of secondary economic impacts. RT Vol. 187 at 54. The objection was based upon the argument that the testimony and exhibits of the Kansas experts did not meet the tests for expert testimony set forth in the *Daubert* and *Kumho Tire Co.* cases.[1] Colorado

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[1] *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993); *Kumho Tire Co., Ltd. v.*

filed a written brief in support of its objection, and Kansas was given the opportunity to reply. Colorado also renewed its "gatekeeper" objection to keep Professor Hamilton off the stand when he returned to testify on rebuttal. RT Vol. 206 at 7. That objection was overruled, and the testimony and evidence on secondary economic damages was completed. However, the basic Colorado objection, in essence a motion to strike, was taken under submission. RT Vol. 206 at 6.

Rule 702 of the Federal Rules of Evidence provides:

> "If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise."

In the *Daubert* case, the U.S. Supreme Court addressed the admissibility of scientific expert testimony under this Rule. The case involved the use of a prescription drug, Bendectin, taken during pregnancy, and the allegation that it had caused serious birth defects. A summary judgment was granted on behalf of the defendant drug company based upon a vast body of epidemiological data concerning the drug. The plaintiff's expert testimony, which relied upon animal-cell and live animal studies, and chemical structure analyses, was ruled inadmissible. Relying upon *Frye*,[2] the trial court found that these

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Carmichael, 526 U.S. ___, 119 S.Ct. 1167, 143 L.Ed.2d at 238 (1999).

[2] *Frye v. United States*, 54 App. DC 46, 293 F. 1013 (1923).

studies were not "generally accepted" by the scientific community as being reliable.

The Supreme Court recognized that the "general acceptance" test had been the dominant standard for some 70 years since the *Frye* case, but nonetheless sharp divisions existed among the courts. The Court noted that the *Frye* decision predated Rule 702, and held that the general acceptance test, as the exclusive standard for admissibility of expert scientific testimony, was incompatible with the Federal Rules. The Rules, said the Court, assign to the trial judge "the task of ensuring that an expert's testimony both rests on a reliable foundation and is relevant to the task at hand." 509 U.S. at 597. The Court emphasized that the Rule 702 inquiry is a "flexible one." *Id.* at 594.

The Court also discussed specific factors such as testing, peer review, error rates, and general acceptability in the scientific community, which might prove helpful in determining the admissibility of a particular scientific "theory or technique." *Id.* at 593-94. These factors are nicely summarized in the *Kumho Tire* case,[3] but the Court makes it clear that they "may or may not be pertinent in assessing reliability." 143 L.Ed. 2d at 251. They can neither be ruled out, nor ruled in, since "Too much depends upon the particular circumstances of the particular case at issue." *Id.* at 252. The objective of the *Daubert* gatekeeping obligation, said the Court, is "to enforce the reliability and relevancy of expert testimony," and in this inquiry

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[3] *Kumho Tire Co., Ltd. v. Carmichael*, 526 U.S.___, 143 L.Ed. 2d 238, 119 S.Ct. 1167.

the trial court "must have considerable leeway." *Id.* at 252.

The *Kumho Tire* case involved the blowout of a tire, claimed to be defective by design or manufacture, which resulted in the death of a passenger. While the plaintiff's expert testimony was more technical than scientific the Court held that the *Daubert* ruling applies not only to scientific expert testimony, but to "all expert testimony." *Id.* at 250. In the case at hand, the Colorado objection relates to the testimony of one expert qualified in the area of "agricultural economics," and the other in the area of "economic modeling." RT Vol. 185 at 66; RT Vol. 186 at 55. Clearly they are both subject to the principles in the *Daubert* and *Kumho Tire* cases.

The secondary impacts to the Kansas economy as a whole were estimated through a process known as an input-output analysis. This process traces the ripple effects of the depletions within the ditch service areas, and the lowered groundwater levels in the adjacent region, throughout the statewide economy. The study of secondary economic impacts as part of the discipline of economics dates back to the mid-eighteenth century in France. RT Vol. 185 at 68. However, it was not until the 1930s that the concepts were more rigidly specified and converted to a mathematical rigor by Professor Leontief at Harvard University. *Id.* at 69. He received a Nobel Prize for his work. *Id.* The use of input-output computer models came into common usage after World War II. *Id.* at 71. The methodology, that is, the mathematics, of these models is formalized in a textbook by Miller and Blair, now considered the "bible" for input-output analysts. RT

Vol. 185 at 72-73; RT Vol. 186 at 78; Kan. Exh. 953. Beginning in the 1970s, with the rapid development of computer power, it became possible to construct input-output models for regions based on data collected and assembled by the federal government and others. RT Vol. 185 at 74; RT Vol. 186 at 59-60. The regional model constructed and used by the Kansas experts in this case to compute secondary economic damages applies accepted Miller and Blair principles. RT Vol. 185 at 72-73.

The Kansas regional model was constructed by Dr. Robison. It begins with the use of an input-output modeling system known as IMPLAN. This is a framework which uses national level coefficients, and from that starting point IMPLAN can calculate an appropriate region-specific, input-output model. RT Vol. 185 at 81. IMPLAN was developed in the early 1980s by the U.S. Forest Service for use in land management impact planning and analysis. Kan. Exh. 892, Section D at 5. However, the IMPLAN model is now maintained by the U.S. Department of Commerce, Bureau of Economic Analysis. RT Vol. 186 at 57, 61-62. It is a model that includes extensive survey data for the entire United States economy, covering more than 500 sectors of economic detail. It shows who sells to whom, and who buys from whom. In essence, the input-output model is a very elaborate double-entry accounting system. The sales to various sectors across a row have to balance with purchases from each sector down the column. RT Vol. 186 at 57-58.

In 1987 a private corporation, the Minnesota IMPLAN Group, located at the University of Minnesota, began work on regional IMPLAN data and software. Kan. Exh. 962; RT Vol. 186 at 59. The group now maintains data

at the county level, including statistics on employment, income, dividends, interest, rents, transfer payments, earnings, and other kinds of information that are needed to build a model, and these data have been privatized. RT Vol. 186 at 59-60. More than 125 significant studies and research projects have used IMPLAN software and these regional data since they have become commercially available. *Id.* at 60. The Kansas input-output model developed by Dr. Robison takes the national model, couples it with region-specific information, and converts the national model into a regional input-output model for the State of Kansas. *Id.* at 62.

In 1996-97, the U.S. Department of Commerce, Economic Development Administration, assessed the economic impact of 175 of its recent public works projects. Dr. Robison was hired to do the economic modeling for this study, in association with Princeton and Rutgers Universities. He constructed 175 different IMPLAN models to conduct the work. RT Vol. 186 at 50. Dr. Robison is now working with the Economic Development Administration on a new study that will involve constructing between 800 and 900 county-level IMPLAN models. *Id.* at 51. In 1997 Dr. Robison worked for the Colorado Department of Transportation to build about 10 IMPLAN models for different subregions of the Colorado economy. *Id.* at 51-52. The record discloses many more examples of input-output modeling, but perhaps it is sufficient here merely to note that there was no challenge to the testimony that IMPLAN is the "most widely used" model for assessing secondary economic impacts. RT Vol. 185 at 80; RT Vol. 186 at 26. Numerous peer reviewed journal articles, a number of which were authored by

Professor Hamilton and Dr. Robison, also support the broad acceptance and reliability of imput-output modeling. Kan. Exhs. 938, 961.

There can be no doubt that evidence resulting from an input-output model analysis, and from IMPLAN in particular, meet the admissibility standards of *Daubert* and *Kumho Tire*. Colorado itself acknowledges that "input-output modeling rests upon a foundation which is generally recognized in the field of economics." Colo. Objection at 3. The Colorado position, however, is based upon a more discreet objection to IMPLAN, that is, whether it is sufficiently reliable to calculate secondary economic impacts going backwards for a period of 45 years, and forward for 50 years. This issue depends upon the use of "multipliers" within the modeling system.

Multipliers are computed from the input-output model and are used to show the effects of changes in an economy. RT Vol. 185 at 75. They translate the ripple effects of a primary impact on the economy into resulting impacts on various sectors of the economy. *Id.* The input-output model constructed by Kansas experts in this case is a snapshot of the Kansas economy in 1995. RT Vol. 186 at 74. The issue raised by Colorado is whether the multiplier relationships existing in 1995 are sufficiently stable to permit the model to be used for other years. Colorado raises the question, but has offered no evidence that IMPLAN cannot be used in this fashion. Dr. Robison's review of the literature indicates that the input-output coefficient tables are relatively stable and may be used for years. RT Vol. 186 at 77-79, 84-93. Dr. Robison cited examples of input-output models being used to look ahead 20 years and back almost that period of time. *Id.* at 92-97. If

the multipliers were not stable, they would be "going down" in Dr. Robison's opinion, and that would mean that the Kansas approach underestimates secondary economic impacts. *Id.* at 99. This testimony was given as part of Kansas' case in chief, and it was at the conclusion of Dr. Robison's cross-examination that Colorado made its *Daubert* objection.

In response, as part of its rebuttal case, Kansas produced evidence that the IMPLAN model is currently being used by the United States Corps of Engineers to look ahead 100 years. Kan. Exh. 1084; RT Vol. 206 at 35-36, 72-73. The study, dated November 1999, considers a series of alternatives for salmon recovery. These include the "breaching" of four dams on the lower Snake River which would essentially eliminate water storage, reducing the water supply available to agriculture and for hydro power. RT Vol. 206 at 33-34. Professor Hamilton, as chair of the Independent Economic Analysis Board of the Northwest Power Planning Council, provided technical review and oversight of these economic impact studies. This latest use of the IMPLAN model effectively responds to Colorado's argument that the Kansas evidence on secondary economic impacts is inadmissible when used over the time periods involved in this case.

Colorado also objects to the 20 percent limitation on the IMPLAN results imposed by the Kansas experts in order to limit secondary impacts to their net effect on the Kansas economy. However, that step is outside of the IMPLAN product. It is a judgment decision made by the input-output analyst, and is not part of the model nor the standards affecting its admissibility. RT Vol. 206 at 84-86.

The Colorado objection to the admissibility of expert testimony regarding secondary economic damages is hereby overruled. This Order applies to the admissibility and not to the weight of the testimony.

DATED: May 1, 2000.

/s/ Arthur L. Littleworth
ARTHUR L. LITTLEWORTH
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business address is Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502.

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On May 1, 2000, I served the within **ORDER OVERRULING COLORADO'S OBJECTION TO THE ADMISSIBILITY OF EXPERT TESTIMONY REGARDING SECONDARY ECONOMIC DAMAGES** by placing a copy of the document in a separate envelope for each addressee named below and addressed to each such addressee as follows:

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I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on May 1, 2000, at Riverside, California.

/s/ Sandra L. Simmons
Sandra L. Simmons

APPENDIX – Exhibit 9

Stipulation filed November 23, 1998, Table 4B

TABLE 4B
Summary of Analysis to Estimate Impacts in Kansas caused by Depletions to Usable Stateline Flows
Summary Total

Compact Year	Compact Year	Historical					Depletions to Usable Stateline Flow			Allocation of depletions to Canals						Canal Supply with Allocated Depletions			Historical		Impacts of Reduced Deliveries	
		Irrigated Area, ac	Historical Divs., af	FHG Delivery, af	Unit FHG (af/ac)		Total af	Recharge af	Irrigation af	CIR Shortage		Diversions af	FHG Delivery, af	Delivery Loss, af	Unit FHG Del (af/ac)	Total Divs., af	FHG Delivery		Land served by Wells		Additional Well Pumping, af	Farm Del. not Repl, af
					Requirmnt.	Delivery				% of All Canals	af						af	af/ac	acres	%		
a	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v
1950	1950	50,839	94,208	63,824	2.09	1.26	186	22	164	100%	31,920	164	106	57	0.00	94,372	63,930	1.26	22,209	43.7%	45	61
1951	1951	50,799	74,588	49,976	1.85	0.98	1,154	177	977	100%	30,245	977	644	333	0.01	75,565	50,621	1.00	22,730	44.7%	282	362
1952	1952	50,759	61,442	42,808	3.33	0.84	939	163	776	100%	83,100	776	518	258	0.01	62,218	43,326	0.85	23,251	45.8%	257	262
1953	1953	50,719	92,086	63,788	2.04	1.26	2,229	348	1,881	100%	33,745	1,881	1,235	646	0.02	93,967	65,023	1.28	23,772	46.9%	614	621
1954	1954	50,679	72,001	47,641	3.30	0.94	4,552	683	3,869	100%	78,853	3,869	2,615	1,254	0.05	75,870	50,256	0.99	24,294	47.9%	1,375	1,241
1955	1955	50,638	111,273	72,725	2.88	1.44	9,467	1,441	8,026	100%	51,126	8,026	5,403	2,623	0.11	119,298	78,128	1.54	24,815	49.0%	2,891	2,512
1956	1956	50,598	76,199	53,891	3.31	1.07	9,445	1,548	7,897	100%	76,534	7,897	5,192	2,705	0.10	84,096	59,083	1.17	25,336	50.1%	2,732	2,460
1957	1957	50,558	126,077	83,028	2.25	1.64	4,259	1,208	3,051	100%	24,272	3,051	1,988	1,063	0.04	129,128	85,017	1.68	25,857	51.1%	961	1,028
1958	1958	50,518	82,614	59,689	2.06	1.18	6,251	2,350	3,901	100%	32,854	3,901	2,417	1,485	0.05	86,516	62,106	1.23	26,378	52.2%	1,184	1,233
1959	1959	50,478	131,563	90,324	2.04	1.79	1,226	344	882	100%	13,181	882	486	395	0.01	132,445	90,810	1.80	26,899	53.3%	230	256
1960	1960	50,438	56666	38,205	2.30	0.76	12,307	1,682	10,625	100%	50,564	10,625	7,019	3,606	0.14	67,290	45,224	0.90	27,421	54.4%	3,967	3,052
1961	1961	50,398	84841	55,578	2.05	1.10	9,213	1,511	7,702	100%	31,540	7,702	4,973	2,729	0.10	92,543	60,551	1.20	27,942	55.4%	2,840	2,132
1962	1962	50,358	78018	55,217	2.59	1.10	5,151	798	4,353	100%	50,191	4,353	2,741	1,612	0.05	82,371	57,959	1.15	28,463	56.5%	1,567	1,174
1963	1963	50,318	56531	35,578	2.65	0.71	9,601	1,428	8,173	100%	63,767	8,173	5,480	2,693	0.11	64,704	41,058	0.82	28,984	57.6%	3,331	2,149
1964	1964	50,277	40588	27,988	2.59	0.56	12,132	2,080	10,052	100%	67,861	10,052	6,571	3,481	0.13	50,640	34,559	0.69	29,505	58.7%	3,950	2,621
1965	1965	50,237	86551	56,300	1.57	1.12	20,964	4,024	16,940	100%	14,620	16,940	10,939	6,002	0.22	103,491	67,239	1.34	30,026	59.8%	8,270	2,669
1966	1966	50,197	157175	109,591	2.57	2.18	3,435	974	2,461	100%	19,313	2,461	1,277	1,184	0.03	159,636	110,869	2.21	30,547	60.9%	831	446
1967	1967	48,646	153982	109,176	1.91	2.24	2,721	681	2,040	100%	9,414	2,040	819	1,221	0.02	156,022	109,995	2.26	29,519	60.7%	461	358
1968	1968	48,595	91899	65,006	2.15	1.34	20,494	2,792	17,702	100%	27,626	17,702	10,500	7,203	0.22	109,602	75,505	1.55	29,991	61.7%	6,591	3,909
1969	1969	48,545	84185	56,089	1.68	1.16	9,228	1,480	7,748	100%	16,999	7,748	4,745	3,003	0.10	91,933	60,834	1.25	30,464	62.8%	3,308	1,437
1970	1970	45,558	97198	63,896	2.24	1.40	8,817	1,284	7,533	100%	25,722	7,533	4,592	2,941	0.10	104,730	68,489	1.50	28,385	62.3%	2,895	1,697
1971	1971	45,472	70000	46,561	1.65	1.02	8,815	1,374	7,441	100%	21,402	7,441	4,634	2,807	0.10	77,441	51,195	1.13	28,769	63.3%	2,871	1,763
1972	1972	45,386	72264	45,127	1.96	0.99	10,747	1,690	9,057	100%	29,966	9,057	6,015	3,042	0.13	81,321	51,141	1.13	29,153	64.2%	3,920	2,095
1973	1973	45,299	65260	42,515	2.25	0.94	6,782	1,212	5,570	100%	38,926	5,570	3,617	1,954	0.08	70,830	46,132	1.02	29,537	65.2%	2,432	1,185
1974	1974	45,213	40345	25,674	2.55	0.57	9,300	1,426	7,874	100%	58,620	7,874	5,218	2,657	0.12	48,219	30,892	0.68	29,921	66.2%	3,490	1,728
1975	1975	45,127	22941	16,670	2.16	0.37	14,582	2,681	11,901	100%	53,082	11,901	7,801	4,100	0.17	34,842	24,471	0.54	30,305	67.2%	5,318	2,482
1976	1976	45,040	10608	6,333	2.32	0.14	23,131	3,738	19,393	100%	63,856	19,393	13,087	6,306	0.29	30,001	19,421	0.43	30,689	68.1%	8,856	4,231
1977	1977	44,954	10905	7,961	1.70	0.18	18,443	3,081	15,362	100%	44,633	15,362	10,358	5,004	0.23	26,267	18,319	0.41	31,073	69.1%	7,164	3,195
1978	1978	44,868	23790	15,668	2.48	0.35	24,079	3,950	20,129	100%	62,237	20,129	13,550	6,580	0.30	43,920	29,218	0.65	31,457	70.1%	9,474	4,076
1979	1979	44,782	8262	6,499	2.07	0.15	23,442	3,827	19,615	100%	55,909	19,615	13,105	6,511	0.29	27,878	19,603	0.44	31,841	71.1%	9,288	3,817
1980	1980	44,695	69927	46,912	2.35	1.05	5,945	1,687	4,258	100%	39,880	4,258	2,834	1,425	0.06	74,186	49,746	1.11	32,225	72.1%	2,031	803
1981	1981	44,609	24099	18,845	2.01	0.42	8,427	1,624	6,80[illegible]	100%	47,960	6,803	4,480	2,323	0.10	30,901	23,325	0.52	32,609	73.1%	3,261	1,219
1982	1982	44,523	43089	29,177	1.87	0.66	14,281	2,479	11,802	100%	36,728	11,802	7,916	3,887	0.18	54,891	37,093	0.83	32,993	74.1%	5,841	2,074
1983	1983	44,436	103810	68,607	2.16	1.54	3,097	879	2,218	100%	17,780	2,218	1,399	819	0.03	106,029	70,006	1.58	33,377	75.1%	1,051	348
1984	1984	44,350	117496	77,106	1.89	1.74	3,127	883	2,244	100%	6,736	2,244	1,349	894	0.03	119,740	78,455	1.77	33,761	76.1%	1,044	305
1985	1985	44,264	103734	69,597	2.31	1.57	0	0	0	100%	21,363	0	0	0	0.00	103,734	69,597	1.57	34,145	77.1%	0	0
1986	1986	44,178	136786	89,263	2.14	2.02	8,124	1,337	6,787	100%	6,786	6,787	4,396	2,391	0.10	143,572	93,659	2.12	34,529	78.2%	3,416	980
1987	1987	44,091	107563	75,002	1.98	1.70	1,916	705	1,211	100%	10,293	1,211	661	550	0.01	108,774	75,662	1.72	34,913	79.2%	561	100
1988	1988	44,005	129254	85,240	2.54	1.94	5,664	1,037	4,627	100%	17,110	4,627	2,968	1,659	0.07	133,881	88,209	2.00	35,297	80.2%	2,360	609
1989	1989	44,005	68459	46,141	1.53	1.05	7,174	1,304	5,870	100%	14,620	5,870	3,885	1,986	0.09	74,329	50,026	1.14	35,297	80.2%	3,064	820
1990	1990	44,005	43548	29,919	1.89	0.68	13,073	2,067	11,006	100%	35,601	11,006	7,395	3,611	0.17	54,554	37,315	0.85	35,297	80.2%	5,781	1,614
1991	1991	44,005	40106	26,883	2.02	0.61	16,685	2,662	14,023	100%	40,843	14,023	9,561	4,462	0.22	54,130	36,444	0.83	35,297	80.2%	7,429	2,132
1992	1992	44,005	47913	31,747	1.82	0.72	17,328	2,755	14,573	100%	31,424	14,573	9,885	4,688	0.22	62,486	41,632	0.95	35,297	80.2%	7,653	2,233
1993	1993	44,005	53952	36,175	1.85	0.82	8,448	1,540	6,908	100%	29,268	6,908	4,666	2,242	0.11	60,860	40,841	0.93	35,297	80.2%	3,667	999
1994	1994	44,005	66798	45,723	1.81	1.04	13,690	2,265	11,425	100%	22,201	11,425	7,523	3,902	0.17	78,223	53,245	1.21	35,297	80.2%	5,972	1,551
AVERAGE	*AVERAGES:*																					
1950-85	1950-85	47,866	74,895	50,655	2.25	1.06	9,110	1,599	7,512	100%	39,792	7,512	4,878	2,633	0.10	82,407	55,533	1.16	28,851	60.3%	3,184	1,694
1986-94	1986-94	44,034	77,153	51,788	1.95	1.18	10,234	1,741	8,492	100%	23,127	8,492	5,660	2,832	0.13	85,646	57,448	1.30	35,169	79.9%	4,434	1,226
1950-94	1950-94	47,099	75,347	50,881	2.19	1.08	9,335	1,627	7,708	100%	36,459	7,708	5,035	2,673	0.11	83,054	55,916	1.19	30,115	63.9%	3,434	1,601
TOTALS:	*TOTALS:*																					
1950-85	1950-85	1,723,171	2,696,216	1,823,569		1.06	327,969	57,549	270,420		1,432,525	270,420	175,623	94,797	0.10	2,966,636	1,999,193	1.16	1,038,648		114,624	60,999
1986-94	1986-94	396,304	694,380	466,093		1.18	92,103	15,672	76,431		208,146	76,431	50,939	25,491	0.13	770,810	517,032	1.30	316,521		39,903	11,037
1950-94	1950-94	2,119,475	3,390,596	2,289,662		1.08	420,071	73,221	346,850		1,640,671	346,850	226,563	120,288	0.11	3,737,446	2,516,225	1.19	1,355,170		154,526	72,036

TABLE 4B - Part 2
Summary of Analysis to Estimate Impacts in Kansas caused by Depletions to Usable Stateline Flows
Summary Total

Nonbeneficial CU (SEV):	27%
Farm Irrigation Efficiency	65%
Tail Water (% FHG)	10%

Compact Year	Net Reduction in Recharge - Details										Change in SEV, af	Net Reduction in Recharge Summary						
	Delivery Loss			Farm Delivery Losses			Pumping Consumptive Use			Irrigation		Canal Service Area					River	Grand
	Rchg, af	SEV, af	Total, af	Rchg, af	SEV, af	Total, af	Crop CU, af	SEV, af	Total, af	Rchg, af		Ditch Loss, af	Reservoir Seep, af	Farm Delivery, af	Pumping CU, af	Total af	Loss, af	Total, af
a	w	x	y	z	aa	ab	ac	ad	ae	af	ag	ah	ai	aj	ak	al		
1950	32	25	57	34	3	37	29	1	31	97	27	31	1	34	31	97	22	119
1951	181	152	333	208	17	225	184	8	191	580	162	172	9	208	191	580	177	757
1952	147	111	258	167	14	181	167	7	174	488	118	141	6	167	174	488	163	651
1953	372	274	646	399	33	432	399	17	416	1,186	291	358	14	399	416	1,186	348	1,534
1954	726	528	1,254	845	71	915	894	37	931	2,501	562	699	27	845	931	2,501	683	3,184
1955	1,525	1,098	2,623	1,745	146	1,891	1,879	78	1,957	5,227	1166	1,469	55	1,745	1,957	5,227	1,441	6,668
1956	1,521	1,183	2,705	1,677	140	1,817	1,776	74	1,850	5,048	1250	1,457	64	1,677	1,850	5,048	1,548	6,596
1957	589	474	1,063	642	54	696	624	26	650	1,881	502	562	27	642	650	1,881	1,208	3,089
1958	763	722	1,485	781	65	846	769	32	801	2,345	756	717	46	781	801	2,345	2,350	4,695
1959	192	204	395	157	13	170	149	6	156	504	211	178	14	157	156	504	344	848
1960	2,018	1,588	3,606	2,267	190	2,457	2,579	107	2,686	6,971	1670	1,930	87	2,267	2,686	6,971	1,682	8,653
1961	1,491	1,238	2,729	1,606	134	1,740	1,846	77	1,923	5,020	1295	1,420	71	1,606	1,923	5,020	1,511	6,531
1962	862	750	1,612	885	74	960	1,019	42	1,061	2,808	781	817	45	885	1,061	2,808	798	3,606
1963	1,548	1,145	2,693	1,770	148	1,918	2,165	90	2,255	5,573	1203	1,488	59	1,770	2,255	5,573	1,428	7,001
1964	1,937	1,544	3,481	2,122	177	2,300	2,568	107	2,674	6,733	1615	1,851	86	2,122	2,674	6,733	2,080	8,813
1965	2,970	3,032	6,002	3,533	295	3,829	5,375	223	5,599	12,101	3104	2,769	201	3,533	5,599	12,101	4,024	16,125
1966	497	687	1,184	413	34	447	540	22	563	1,472	699	445	52	413	563	1,472	974	2,446
1967	481	740	1,221	265	22	287	300	12	312	1,058	749	423	58	265	312	1,058	681	1,739
1968	3,664	3,538	7,203	3,391	283	3,675	4,284	178	4,462	11,518	3644	3,438	227	3,391	4,462	11,518	2,792	14,310
1969	1,496	1,507	3,003	1,533	128	1,661	2,150	89	2,240	5,268	1545	1,397	99	1,533	2,240	5,268	1,480	6,748
1970	1,539	1,401	2,941	1,483	124	1,607	1,882	78	1,960	4,983	1447	1,453	86	1,483	1,960	4,983	1,284	6,267
1971	1,528	1,279	2,807	1,497	125	1,622	1,866	78	1,944	4,969	1326	1,454	74	1,497	1,944	4,969	1,374	6,343
1972	1,762	1,280	3,042	1,943	162	2,105	2,548	106	2,654	6,359	1336	1,697	65	1,943	2,654	6,359	1,690	8,049
1973	1,106	848	1,954	1,168	98	1,266	1,581	66	1,646	3,920	880	1,061	46	1,168	1,646	3,920	1,212	5,132
1974	1,544	1,112	2,657	1,685	141	1,826	2,268	94	2,362	5,592	1159	1,488	56	1,685	2,362	5,592	1,426	7,018
1975	2,347	1,753	4,100	2,520	211	2,730	3,457	144	3,601	8,467	1821	2,255	92	2,520	3,601	8,467	2,681	11,148
1976	3,697	2,608	6,306	4,227	353	4,581	5,757	239	5,996	13,920	2722	3,569	129	4,227	5,996	13,920	3,738	17,658
1977	3,521	1,482	5,004	3,346	280	3,625	4,656	193	4,850	11,717	1568	3,000	522	3,346	4,850	11,717	3,081	14,798
1978	4,636	1,943	6,580	4,377	366	4,742	6,158	256	6,414	15,427	2053	3,973	664	4,377	6,414	15,427	3,950	19,377
1979	4,582	1,928	6,511	4,233	354	4,587	6,037	251	6,288	15,103	2031	3,904	678	4,233	6,288	15,103	3,827	18,930
1980	1,004	420	1,425	915	77	992	1,320	55	1,375	3,295	442	862	142	915	1,375	3,295	1,687	4,982
1981	1,631	691	2,323	1,447	121	1,568	2,119	88	2,208	5,286	724	1,375	256	1,447	2,208	5,286	1,624	6,910
1982	2,741	1,145	3,887	2,557	214	2,771	3,797	158	3,955	9,253	1201	2,360	381	2,557	3,955	9,253	2,479	11,732
1983	576	243	819	452	38	490	683	28	711	1,740	252	489	87	452	711	1,740	879	2,619
1984	623	271	894	436	36	472	679	28	707	1,766	280	503	119	436	707	1,766	883	2,649
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	1,674	717	2,391	1,420	119	1,539	2,221	92	2,313	5,407	743	1,391	283	1,420	2,313	5,407	1,337	6,744
1987	376	175	550	213	18	231	364	15	380	969	177	272	104	213	380	969	705	1,674
1988	1,162	496	1,659	959	80	1,039	1,534	64	1,597	3,718	513	969	193	959	1,597	3,718	1,037	4,755
1989	1,401	585	1,986	1,255	105	1,360	1,992	83	2,075	4,730	607	1,207	194	1,255	2,075	4,730	1,304	6,034
1990	2,558	1,053	3,611	2,389	200	2,588	3,758	156	3,914	8,860	1097	2,246	311	2,389	3,914	8,860	2,067	10,927
1991	3,166	1,296	4,462	3,088	258	3,346	4,829	201	5,029	11,284	1353	2,804	362	3,088	5,029	11,284	2,662	13,946
1992	3,319	1,369	4,688	3,193	267	3,460	4,974	207	5,181	11,693	1429	2,910	409	3,193	5,181	11,693	2,755	14,448
1993	1,590	652	2,242	1,507	126	1,633	2,384	99	2,483	5,580	679	1,406	185	1,507	2,483	5,580	1,540	7,120
1994	2,756	1,147	3,902	2,430	203	2,633	3,882	161	4,043	9,228	1189	2,385	371	2,430	4,043	9,228	2,265	11,493
AVERAGE																		
1950-85	1,551	1,082	2,633	1,576	132	1,707	2,070	86	2,156	5,283	1,128	1,422	129	1,576	2,156	5,283	1,599	6,881
1986-94	2,000	832	2,832	1,828	153	1,981	2,882	120	3,002	6,830	865	1,732	268	1,828	3,002	6,830	1,741	8,571
1950-94	1,641	1,032	2,673	1,626	136	1,762	2,232	93	2,325	5,592	1,075	1,484	157	1,626	2,325	5,592	1,627	7,219
TOTALS:																		
1950-85	55,849	38,948	94,797	56,726	4,742	61,468	74,506	3,095	77,600	190,176	40,594	51,203	4,646	56,726	77,600	190,176	57,549	247,725
1986-94	18,002	7,489	25,491	16,453	1,375	17,829	25,937	1,077	27,014	61,470	7,787	15,590	2,412	16,453	27,014	61,470	15,672	77,142
1950-94	73,851	46,437	120,288	73,180	6,117	79,297	100,442	4,172	104,614	251,645	48,382	66,793	7,058	73,180	104,614	251,645	73,221	324,866

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No. 105, Original

In The

Supreme Court of the United States

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

UNITED STATES OF AMERICA,

Defendant-Intervenor.

On Exceptions To The Report Of The Special Master

COLORADO'S EXCEPTIONS TO THE THIRD REPORT OF THE SPECIAL MASTER AND BRIEF IN SUPPORT THEREOF

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On Exceptions To The Report
Of The Special Master

COLORADO'S EXCEPTIONS TO THE THIRD REPORT OF THE SPECIAL MASTER

The State of Colorado respectfully files the following exceptions to the Third Report of Special Master Arthur L. Littleworth dated August 2000:

1. Colorado excepts to the Special Master's recommendation that a monetary remedy for violations of the Arkansas River Compact should include losses suffered by individual water users in Kansas.

2. Colorado excepts to the Special Master's recommendation that the unliquidated nature of Kansas' claim

for damages should not limit an award of prejudgment interest.

3. Colorado excepts to the Special Master's recommendation that Kansas' damages should include prejudgment interest at the rates proposed by Kansas and that prejudgment interest should be awarded from 1969 to the date of the judgment.

4. Colorado excepts to the Special Master's recommendation that damages for crop production losses on surface water only lands in Kansas should be based on the crop yield-evapotranspiration relationships used by the Kansas experts.

Respectfully submitted,

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QUESTIONS PRESENTED

The State of Colorado will address the following issues:

1. Whether the Special Master erred in recommending that money damages awarded to the State of Kansas for violations of the Arkansas River Compact should include losses suffered by individual water users in Kansas.

2. Whether the Special Master erred in failing to consider extenuating factors in determining the amount of damages that should be awarded for violation of the Arkansas River Compact.

3. Whether the Special Master erred in recommending that prejudgment interest should be awarded on unliquidated damages; or, if prejudgment interest is awarded, whether the Master properly considered factors that should limit an award of prejudgment interest.

4. Whether the Special Master erred in recommending that prejudgment interest should be awarded on damages suffered by individuals in Kansas at the interest rates paid by those individuals, rather than the interest rates received by the State of Kansas.

5. Whether the Special Master erred in accepting the crop production losses estimated by the Kansas experts to determine damages.

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First Report of Arthur L. Littleworth, Special Master (July 1994) ..... *passim*

Second Report of Arthur L. Littleworth, Special Master (September 1997) ..... *passim*

Third Report of Arthur L. Littleworth, Special Master (August 2000) ..... *passim*

BRIEF IN SUPPORT OF COLORADO'S EXCEPTIONS TO THE THIRD REPORT OF THE SPECIAL MASTER

The State of Colorado submits this brief in support of its exceptions to the Third Report of Arthur L. Littleworth, Special Master.

JURISDICTION

The Court has original jurisdiction of this case under Article III, Section 2, of the United States Constitution and 28 U.S.C. § 1251(a).

STATEMENT OF THE CASE

This original action is before the Court on exceptions to the Third Report of Special Master Arthur L. Littleworth, which contains his recommendations on a remedy for depletions to usable Stateline flows in violation of the Arkansas River Compact.

1. Summary Of The Prior Proceedings

The State of Kansas brought this original action against the State of Colorado to resolve disputes under the Arkansas River Compact, Act of May 31, 1949, ch. 155, 63 Stat. 145 (1949) ("Compact"). This Court granted Kansas leave to file its complaint, *Kansas v. Colorado*, 475 U.S. 1079 (1986), and later appointed Arthur L. Littleworth as the Special Master. 484 U.S. 910 (1987). The Master conducted a trial limited to questions of liability

and submitted a report recommending that the Court find that post-Compact well pumping in Colorado had violated Article IV-D of the Compact. This Court overruled the exceptions of both Kansas and Colorado to the Master's first report and remanded the case to the Master for determination of unresolved issues in a manner not inconsistent with the opinion. 514 U.S. 673 (1995).

The Master submitted a second report in September 1997, in which he quantified depletions to usable Stateline flows through 1994, reviewed Colorado's actions to comply with the Compact, and made recommendations concerning a remedy for past depletions. Colorado filed exceptions to two of the Master's recommendations. This Court overruled the exceptions without prejudice to Colorado's right to renew those exceptions at the conclusion of the remedial proceedings. 522 U.S. 1073 (1998).

2. Proceedings Leading Up To The Trial Of The Remedy Phase

After Kansas filed its complaint in 1986, the Court held for the first time that money damages could be awarded as a remedy for breach of an interstate water compact. *Texas v. New Mexico*, 482 U.S. 124 (1987).[1] Kansas

[1] That case was remanded to its Special Master for such further proceedings as he deemed necessary and for his recommendation as to whether New Mexico should be allowed to elect a monetary remedy and, if so, to suggest the size of the payment and other terms that New Mexico must satisfy. *Texas v. New Mexico*, 482 U.S. at 132. In 1990, Texas and New Mexico stipulated to a payment of $14 million as a settlement of all claims for breaches of the Pecos River Compact for the years 1952 through 1985, plus all claims for attorneys' fees and other costs prior to August 10, 1989. *Texas v. New Mexico*, 494 U.S. 111 (1990).

then filed a motion to amend its complaint to include a prayer for general and special damages, which was granted. First Report at 18-19. At Kansas' request, the case was bifurcated into a liability and a remedy phase. *Id.* at 24-25.

Following the Court's decision in 1995, the Master required Kansas to file a statement of its position regarding a remedy for violations of the Compact, indicating whether Kansas sought a remedy in money, water, or a combination of both. Second Report at 3. Kansas stated that it sought a remedy for past violations of the Compact "in the form of money only." *Id.* Kansas also stated that money damages should be the greater of Colorado's gains or Kansas' losses, that money damages should include losses suffered by individual water users in Kansas, and that prejudgment interest should be awarded on all losses. *Id.* at 75, 88, 105 (App. to Third Report at 1, 21, 38).[2]

Colorado asked the Master to rule on certain legal issues related to Kansas' claim for money damages. *See* App. to Third Report at 6-7. In addition, Colorado suggested that repayment of past depletions to usable Stateline flows in water rather than money might be a more equitable remedy. Second Report at 73. In his Second

[2] The Master has reprinted several portions of his Second Report in the Appendix to his Third Report. This brief will cite to the Appendix for those portions of the Second Report.

Report, the Master addressed several legal issues regarding a remedy, including the applicability of the 11th Amendment and prejudgment interest if money damages were recommended as a remedy. *See* Appendix to Third Report at 1-10, 18-44.

3. Trial Of The Remedy Phase

After Colorado's exceptions to the Second Report were overruled, the Master ordered counsel for the States and appropriate experts to confer on hydrologic and engineering facts that would underlie the expert testimony on Kansas' claim for money damages, and the States thereafter entered into a Stipulation to allocate depletions to usable Stateline flows within Kansas for the period 1950-1994. Third Report at 8. The Stipulation was approved by the Master and provided a common factual basis to estimate damages based on the Master's recommendations in his Second Report. *Id.* In addition to the Stipulation, Kansas used, and Colorado accepted, a ground water model to determine water level declines in the regional area, beyond the ditch service areas, resulting from depletions to usable Stateline flows. *Id.* at 9.

Based on the Stipulation and the ground water model results, experts for Kansas estimated four categories of costs or losses resulting from depletions to usable Stateline flows: (1) the additional costs incurred by farmers in the ditch service areas to pump additional ground water to replace depletions of farm headgate deliveries; (2) the increased costs to pump ground water in the larger regional area, in both the past and the future, due to water level declines attributable to depletions of usable

Stateline flows; (3) crop production losses on lands in the ditch service areas that did not have wells to replace depletions to farm headgate deliveries and were irrigated by surface water only; and (4) secondary or indirect economic losses to the Kansas economy resulting from the increased costs of pumping and crop production losses. Third Report at 3.

In each category of costs or losses, the Kansas experts estimated two types of damages: (1) lost state income tax revenues that resulted from higher pumping costs and crop production losses; and (2) after-tax losses suffered by well owners and farmers in Kansas as the result of depletions to usable Stateline flow. In addition to damages, Kansas claimed prejudgment interest on all past losses based on one set of interest rates to compound the losses of Kansas well owners and farmers and another, lower set of interest rates to compound the tax losses of the State of Kansas.

Initially, the Kansas experts' calculation of money damages was $77.67 million in 1998 dollars, which was equivalent to awarding prejudgment interest on the past damages to 1998. Third Report at 16, 87-88. In response to a report prepared by Colorado's expert, the Kansas experts revised their estimates of damages. *Id.* at 16. Additional revisions were made during trial, and the Kansas experts' final calculation of damages, with prejudgment interest to 1998, was $62,369,173. *Id.* at 1, 87. The Kansas claim for damages in nominal dollars (*i.e.*, in the dollars in the year they occurred), including the present value of higher pumping costs in the future, was only $9,218,305. *Id.* at 87. The bulk of Kansas' claim

consisted of $53,150,867 in prejudgment interest from 1950 to 1998. *Id.* at 87-88.

In his Third Report, the Master recommends that a remedy for past depletions to usable Stateline flows should be in money damages rather than repayment in water. Third Report at 11, 119. He recommends that money damages should include all losses that have occurred as a result of Compact violations, including losses suffered by individual water users in Kansas, and that prejudgment interest should be awarded at the rates proposed by Kansas on such losses from 1969 to the date of judgment. *Id.* at 12-13, 64, 107, 119-20. He also makes a number of recommendations on factual issues related to the calculation of damages. *Id.* at 14-86. Based on the Master's recommendations, the States have agreed that the total damages, including prejudgment interest from 1969 to 1998, would be approximately $38,000,000.

SUMMARY OF ARGUMENT

The State of Kansas brought this action to enforce its rights under the Arkansas River Compact, which apportions the waters of the Arkansas River between Colorado and Kansas. This Court resolved the issues of liability in an earlier decision, *Kansas v. Colorado*, 514 U.S. 673 (1995), which accepted the Master's recommendation that post-Compact well pumping in Colorado had violated Article IV-D of the Compact. In his Third Report the Master has recommended money damages as a remedy for the Compact violation.

At the outset, it should be noted that this is not a case where Colorado withheld money owed to Kansas and had the benefit of the use of the money. *Cf. Virginia v. West Virginia*, 206 U.S. 290 (1907) (suit by Virginia against West Virginia for equitable proportion of public debt that West Virginia had agreed to assume). Rather, this is a case where private individuals in Colorado drilled wells and pumped additional ground water after the Compact became effective in 1949. The Compact did not prohibit future development by private individuals in Colorado or Kansas, provided that the usable waters of the Arkansas River were not materially depleted by such development.

Colorado's liability for the violation of the Compact in this case is not because it failed to deliver a specific quantity of water set out in the Compact, but because it failed to limit future beneficial development by private individuals where, for many years, neither State was aware that usable Stateline flows were being depleted by such development. Thus, the facts in this case are different than *Texas v. New Mexico*, where it became clear soon after the Pecos River Compact went into effect that Stateline flows were significantly below the amount that would have been predicted and the Pecos River Commission undertook a study and made findings regarding shortfalls as early as 1961. *Texas v. New Mexico*, 462 U.S. 554, 560-61 (1983).

The Master recommends that Kansas be awarded money damages for all losses that have occurred as a result of Compact violations, including the losses to individual Kansas water users, distinguishing the Court's previous 11th Amendment cases on the grounds that Kansas does not intend to turn over the damages to its

water users. Colorado believes that the Master's recommendation is based on a misunderstanding of the nature of quasi-sovereignty and the limitation imposed by the 11th Amendment.

Further, the Master recommends that prejudgment interest be awarded on damages from 1969, based on his finding that Colorado knew, or should have known, by 1968 that well pumping was depleting usable Stateline flows. This finding is inconsistent with this Court's previous decision that the evidence of the impact of increased well pumping on usable Stateline flows was vague and conflicting.

The Master also recommends that prejudgment interest be awarded at the rates proposed by Kansas, which include rates paid by farmers, notwithstanding the fact that the damages will be paid to the State of Kansas, not the farmers. This recommendation is inconsistent with the basis on which Kansas was allowed to bring this action and is unfair and punitive to Colorado.

Finally, the Master recommends that Kansas be awarded damages for losses to farmers based on estimates of crop production losses by the Kansas experts. The very high losses estimated by the Kansas experts are simply not reasonable.

Colorado believes that this Court, exercising the extraordinary power conferred by the Constitution to resolve controversies between states, should reject the position that a state, suing for breach of an interstate water compact, is necessarily entitled to recover money damages for losses to individuals that have occurred as a

result of such violations. First, the Court's 11th Amendment decisions counsel against such a recovery. Second, other equitable considerations here also counsel against such an award.

In his Third Report, the Master found that neither State knew or had reason to know that post-Compact well pumping in Colorado was depleting usable Stateline flows before 1968, and this Court in its previous opinion pointed out the difficulty of assessing the impact of increases in post-Compact well pumping on usable Stateline flows because of changing conditions during the 1970s and early 1980s. An award of money damages that includes all losses that have occurred as a result of Compact violations, including losses suffered by individual water users in Kansas, is not a fair and equitable remedy in this case. Furthermore, under these circumstances, a departure from common-law principles to award prejudgment interest for the first time in interstate water compact litigation is neither warranted nor fair. However, if the Court rules that an award of prejudgment interest is appropriate, prejudgment interest should only be awarded from 1985, the date Kansas formally complained about post-Compact well pumping, and the interest rates used to award prejudgment interest should be the interest rates received by the State of Kansas, not the farmers who cannot sue Colorado because of the 11th Amendment.

I. A STATE ACTING IN ITS *PARENS PATRIAE* CAPACITY IS NOT ENTITLED TO RECOVER MONEY DAMAGES FOR LOSSES TO INDIVIDUAL WATER USERS THAT HAVE OCCURRED AS A RESULT OF A VIOLATION OF AN INTERSTATE COMPACT

A. Introduction

The case presents several issues of first impression: How should the amount of money damages for violation of an interstate water compact be determined? Should prejudgment interest be allowed on such damages, and, if so, what interest rates should be used to award prejudgment interest? Should extenuating factors be considered in awarding damages or prejudgment interest? *See* Third Report at 10, 11-13. As the Master notes, one commentator[3] has said there is a "special drama" when one state sues another invoking the original jurisdiction of this Court; and, as the Master states, "that drama is surely heightened by the money damage issues in this case." Third Report at 10.

This case may be the first to present these issues, but it will not be the last. While water was and is important in the eastern United States for domestic use, navigation, fisheries, and power generation, *e.g., New Jersey v. New York*, 283 U.S. 336 (1931), irrigation was an absolute necessity to raise crops in the arid and semi-arid regions of the

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[3] Vincent L. McKusick, 45 Maine L. Rev. 185 (1993). Justice McKusick is the former Chief Justice of the Maine Supreme Judicial Court. He served as a Special Master in *Connecticut v. New Hampshire*, No. 119, Original, and is currently serving as Special Master in *Kansas v. Nebraska*, No. 126, Original.

West. *California v. United States*, 438 U.S. 645, 648-49 (1978). Intrastate conflicts over water in the West led to the development of new legal doctrines and institutions. *Id.* at 653-56. Interstate conflicts over water led this Court to announce the doctrine of equitable apportionment in 1907, *Kansas v. Colorado*, 206 U.S. 46 (1907), and, thereafter, to encourage states to settle their differences by compact rather than litigation in this Court. *E.g., Colorado v. Kansas*, 320 U.S. 383, 392 (1943). Since 1922, when commissioners appointed by the seven states of the Colorado River Basin reached an agreement, now known as the Colorado River Compact, *see Arizona v. California*, 373 U.S. 546, 557 (1963), there have been 24 other compacts apportioning the waters of interstate rivers and 12 flood control and water resources compacts. Council of State Governments, *Interstate Compacts and Agencies 1998*, 118-33 (1999).

As population growth has continued in the West, and as new technology has allowed new developments, particularly the use of ground water, pressure on existing apportionments has increased, as this and other recent cases demonstrate. *E.g., Texas v. New Mexico*, 462 U.S. 554 (1983); *Nebraska v. Wyoming*, 515 U.S. 1 (1995) (No. 108, Original); *Kansas v. Nebraska*, No. 126, Original. The new century will likely require this Court, in the exercise of the extraordinary judicial power conferred by the Constitution over controversies between states, to clarify the remedies for breach of interstate water compacts and equitable apportionment decrees entered by the Court. How the Court defines these remedies, and the factors considered in determining such remedies, may well

determine how frequently this Court is called upon to resolve such claims.

B. Colorado's Exception To The Master's Recommendation Is Now Appropriate For Consideration

Based on the fact that Kansas is the signatory to the Compact, and, in the Master's view, the only party that can sue to protect the Stateline flows guaranteed for use by Kansas water users, the Master recommended in his Second Report that if a money remedy were awarded for Compact violations in this case, "the damages should include all losses that have occurred as a result of such violations, including those suffered by individual water users, subject only to the overriding consideration that the remedy must finally be a 'fair and equitable solution'." App. to Third Report at 36, *quoting Texas v. New Mexico*, 482 U.S. 124, 134 (1987). Colorado filed an exception to the Master's recommendation on the grounds that the 11th Amendment to the U.S. Constitution barred an award of damages for the losses suffered by individual water users.

The United States pointed out in its brief in opposition to Colorado's exceptions that it was unclear whether the Master had simply ruled that use of individual loss evidence could be considered in determining Kansas' damages or had ruled that the money damages awarded for past Compact violations necessarily should include such individual losses. Brief for the United States in Opposition to the Exceptions of Colorado 16, 20 n.5

(December 1997). The United States accordingly recommended that Colorado's exceptions be overruled without prejudice because the Master's recommendation concerning the use of evidence of individual losses had uncertain significance at that stage of the proceedings. *Id.* at 10. Ultimately, the Master has recommended a monetary remedy that raises 11th Amendment concerns. Thus, it is now appropriate for the Court to consider Colorado's exception to the Master's recommendation.

C. The 11th Amendment Does Not Allow A State To Present And Enforce The Claims Of Its Citizens

The 11th Amendment to the U.S. Constitution states:

> The Judicial power of the United States shall not be construed to extend to any suit in law or equity, commenced or prosecuted against one of the United States by Citizens of another State, or by Citizens or Subjects of any Foreign State.

This Court has understood the 11th Amendment "to stand not so much for what it says, but for the presupposition which it confirms;" namely, that "federal jurisdiction over suits against unconsenting States 'was not contemplated by the Constitution when establishing the judicial power of the United States.' " *Seminole Tribe of Florida v. Florida*, 517 U.S. 44, 54 (1996), *quoting Blatchford v. Native Village of Noatak*, 501 U.S. 775, 779 (1991), and *Hans v. Louisiana*, 134 U.S. 1, 15 (1890).

As the Master recognizes, this Court's decisions make it clear that if Kansas were suing to recover damages that would be directly turned over to its citizens, the

claim would be barred by the 11th Amendment. *E.g.*, *North Dakota v. Minnesota*, 263 U.S. 365 (1923); *New Hampshire v. Louisiana*, 108 U.S. 76 (1883); App. to Third Report at 23-24, 28. The Master distinguishes such cases on the basis that the recovery in this instance will not go to the individuals, but instead will be paid to Kansas, although he acknowledges that Kansas will be free to spend the money as it decides, including, presumably, turning the money over to its water users. *Id.* at 21-22, 34. In Colorado's view, the Master's conclusion is based on a misunderstanding of the nature of quasi-sovereignty and the limitation imposed by the 11th Amendment.

It is well-settled that a state may obtain injunctive relief to vindicate its quasi-sovereign interests. *See e.g.*, *Kansas v. Colorado*, 206 U.S. 46, 99 (1907); *Georgia v. Tennessee Copper Co.*, 206 U.S. 230, 237 (1907). However, a state's right to represent its quasi-sovereign interests in a controversy between states does not allow a state to present and enforce claims of its citizens. This has been clear since *New Hampshire v. Louisiana*, 108 U.S. 76 (1883), where citizens of New Hampshire assigned their claims on bonds issued by the State of Louisiana to the State of New Hampshire for collection. The Court recognized in that case that the 11th Amendment prevented the citizens who owned bonds from bringing suit on their own behalf against the State of Louisiana. 108 U.S. at 88. Therefore, the Court said, "the real question" was "whether a state can allow the use of its name in such a suit for the benefit of one of its citizens." *Id.* First, the Court rejected the argument that a state could prosecute such suits as sovereign trustee of its citizens. *Id.* at 89-90. Second, the Court rejected the argument that the Constitution granted states

the right to prosecute the claims of their citizens in the federal courts:

> The evident purpose of the [11th] Amendment, so promptly proposed and finally adopted, was to prohibit all suits against a State by or for citizens of other States, or aliens, without the consent of the State to be sued, and, in our opinion, one State cannot create a controversy with another State, within the meaning of that term as used in the judicial clauses of the Constitution, by assuming the prosecution of debts owing by the other State to its citizens. *Such being the case, we are satisfied that we are prohibited, both by the letter and the spirit of the Constitution, from entertaining these suits, and the bill in each of them is, consequently, dismissed.*

108 U.S. at 91 (emphasis in original).

These principles were further developed in *North Dakota v. Minnesota*, 263 U.S. 365 (1923), where an impermissible claim for damages for losses to individuals was coupled with a permissible claim by a state for injury to its quasi-sovereign interests. There, North Dakota sought both an injunction and damages for flooding allegedly caused by drainage ditches in Minnesota. The Court found that North Dakota could seek an injunction against operation of the Minnesota ditches:

> [W]here one state, by a change in its method of draining water from lands within its border, increases the flow into an interstate stream, so that its natural capacity is greatly exceeded and the water is thrown upon the farms of another state, the latter state *has such an interest as quasi sovereign in the comfort, health, and prosperity of her farm owners* that resort may be had to this

> court for relief. It is the creation of a public nuisance of simple type *for which a state may properly ask an injunction.*

Id. at 374 (emphasis added). However, the Court held that North Dakota could not recover damages for losses to its inhabitants whose farms were flooded and whose crops were lost:

> North Dakota, in addition to an injunction, seeks a decree against Minnesota for damages of $5,000 for itself, and of a million dollars for its inhabitants whose farms were injured and whose crops were lost. It is difficult to see how we can grant a decree in favor of North Dakota for the benefit of individuals against the state of Minnesota, in view of the 11th Amendment to the Constitution, which forbids the extension of the judicial power of the United States to any suit in law or equity prosecuted against any one of the United States by citizens of another state, or by citizens and subjects of a foreign state.
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> . . . *The right of a state as parens patriae to bring suit to protect the general comfort, health, or property rights of its inhabitants, threatened by the proposed or continued action of another state, by prayer for injunction, is to be differentiated from its lost power as a sovereign to present and enforce individual claims of its citizens as their trustee against a sister state.* For this reason the prayer for a money decree for the damage done by the floods of 1915 and 1916 to the farms of individuals in the Bois de Sioux valley is denied for lack of jurisdiction.

Id. at 374-76 (emphasis added).

The Court has repeatedly reaffirmed the distinction between proper *parens patriae* actions by states to protect quasi-sovereign interests and improper attempts by states to present and enforce claims for injuries of individual citizens. *E.g., Alfred L. Snapp & Son, Inc. v. Puerto Rico*, 458 U.S. 592, 607 (1982); *Maryland v. Louisiana*, 451 U.S. 725, 745 n.21 (1981) ("[A]n original action between two States only violates the Eleventh Amendment if the plaintiff State is actually suing to recover for injuries to specific individuals."); *Pennsylvania v. New Jersey*, 426 U.S. 660, 665 (1976) ("[A] State has standing to sue only when its sovereign or quasi-sovereign interests are implicated and it is not merely litigating as a volunteer the personal claims of its citizens."); *Hawaii v. Standard Oil Co.*, 405 U.S. 251, 258 n.12 (1972) ("An action brought by one State against another violates the Eleventh Amendment if the plaintiff State is actually suing to recover for injuries to designated individuals.").[4]

The Master reviews these cases but concludes that in the later half of the Twentieth Century there has been "some development" of the Court's attitude toward coupling of private claims with those of a state suing as quasi-sovereign, citing *Maryland v. Louisiana*, 451 U.S. 725 (1981). App. to Third Report at 30. He says that in that case Maryland and several other states challenged the constitutionality of Louisiana's "first-use" tax on natural

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[4] There has been no suggestion that Colorado waived its sovereign immunity to claims by individual water users for violation of the Compact. *Cf. Petty v. Tennessee-Missouri Bridge Comm'n*, 359 U.S. 275 (1959). Indeed, the premise of the Special Master's recommendation is that individual water users have no remedy.

gas, and also sought recovery of the taxes already paid. *Id.* He notes that the complaint estimated the direct injuries to the plaintiff states at $1.5 million and to their citizen consumers of gas at $120 million. *Id.* at 30-31, *citing* 451 U.S. at 736 n.12.

In that case, however, the plaintiff states were not suing for damages, but to have Louisiana's "first-use" tax declared unconstitutional and to have the taxes collected by Louisiana pursuant to the "first-use" tax refunded, which is the relief ultimately granted. *Maryland v. Louisiana*, 452 U.S. 456, 457 (1981). Moreover, the Court ordered that the revenues be refunded to the taxpayers, not to the plaintiff states. *Id.*

In *Maryland v. Louisiana*, the injuries to the citizen consumers were cited to demonstrate that the injury alleged affected the general population of the state so that the plaintiff states were acting as *parens patriae* as the representatives of their citizens. 451 U.S. at 739-744. Louisiana had argued that the case should be dismissed for want of standing because the "first-use" tax was imposed on pipeline companies and not directly on the ultimate consumers. *Id.* at 736. The Court noted that the states were substantial consumers of natural gas and that while the tax was imposed on the pipeline companies, it was clearly intended to be passed on to the ultimate consumer. *Id.* The Court then said that "[i]t is clear that the plaintiff states, as major purchasers of natural gas whose cost has increased as a direct result of Louisiana's imposition of the First-Use Tax, are directly affected in a 'substantial and real' way so as to justify their exercise of this Court's original jurisdiction." *Id.* at 737. The Court then went on to say that jurisdiction was also supported "by

the States' interest as *parens patriae*." *Id.* The Court noted that a state is not permitted to enter a controversy as a nominal party in order to forward the claims of individual citizens, but may act as the representative of its citizens where the injury alleged affects the general population of a state in a substantial way. *Id. Maryland v. Louisiana* did not hold that private claims may be "coupled" with those of a state suing as quasi-sovereign. Rather, the case held that a state may act as *parens patriae* where the injury alleged affects the general population of the state in a substantial way.

D. The Special Master's Recommendation Is Based On The Mistaken Assumption That The 11th Amendment Is Not A Factor In This Case

Notwithstanding the fact that a state as *parens patriae* may not present and enforce the claims of its citizens, the Master concludes that the 11th Amendment is not a barrier to recovery of damages by Kansas for injuries suffered by individual water users in Kansas based on the "fundamental rule" that, once the Court accepts a case between states as involving sovereignty or quasi-sovereignty, "the 11th Amendment is not a factor." App. to Third Report at 36. This "fundamental rule" fails to recognize that, in one action, a state's complaint may raise both proper proprietary or quasi-sovereign claims, over which the Court has jurisdiction, and improper claims for the benefit of individuals. *E.g., North Dakota v. Minnesota*, 263 U.S. at 374-76. The fact that the 11th Amendment is not a factor in a proper original action does not mean that a state can also recover damages for the benefit of individuals in the same action. *Id.*

The Master, however, gives four reasons for allowing Kansas to recover losses suffered by individual water users in this case: (1) the nature of quasi-sovereignty; (2) the Court's statements in *Texas v. New Mexico*, 482 U.S. 124 (1987); (3) the Laramie River decisions, which used individual water rights as the basis for an interstate apportionment; and (4) the lack of any other remedy for Kansas water users. App. to Third Report at 33-36.

First, the Master states that "[q]uasi-sovereignty . . . throws the mantle of the state itself over the area and people involved in order *to permit a general recovery for them*, albeit the recovery is payable to the state itself." App. to Third Report at 34 (emphasis added). This misapprehends the nature of quasi-sovereignty. This Court has made it clear that the concept "does not involve the State stepping in to represent the interests of particular citizens who, for whatever reason, cannot represent themselves." *Snapp*, 458 U.S. at 600[5]; *North Dakota v. Minnesota*, 263 U.S. at 376. Rather, to have *parens patriae* standing, the state must assert injury to its quasi-sovereign interests, *Snapp*, 458 U.S. at 601, which have consistently been described as "*apart from* the interests of particular private parties," *id.* at 607 (emphasis added), "*apart from* that of the individuals affected," *Pennsylvania v. West Virginia*, 262 U.S. 553, 592 (1923) (emphasis added), and "*independent of* and

[5] *Snapp* involved the question of a state (or commonwealth's) standing to bring a *parens patriae* action in federal district court. The Court recognized that "a more circumspect inquiry may be required" into such an issue in original jurisdiction cases between states, to ensure that the 11th Amendment was not "too easily circumvented." 458 U.S. at 611 (Brennan, J., concurring); *see also id.* at 603 n.12.

behind the titles of [a state's] citizens." *Snapp*, 458 U.S. at 604 (emphasis added), quoting *Georgia v. Tennessee Copper Co.*, 206 U.S. 230, 237 (1907). A state's right to protect its quasi-sovereign interest is distinct from its foregone sovereign right to present and enforce its citizens' individual claims as assignee or trustee. *Oklahoma ex rel. Johnson v. Cook*, 304 U.S. 387, 392-93 (1938); *North Dakota v. Minnesota*, 263 U.S. at 374-76; *New Hampshire v. Louisiana*, 108 U.S. at 91. To say that quasi-sovereignty permits a general recovery for individual water users in Kansas undermines the purpose of the 11th Amendment, which was to protect states from the impact of unconsented suits by citizens. *Seminole Tribe*, 517 U.S. at 54.

The Master also concludes that a state should be able to obtain a money remedy for Compact violations that includes losses suffered by individual water users because a state is allowed to sue for repayment in water, which would directly benefit the individual water users in the state. App. to Third Report at 22-23. This conclusion fails to recognize the difference between injunctive relief and damages. The fact that this Court has approved injunctions to vindicate states' quasi-sovereign interests that also may have benefitted private individuals does not suggest that quasi-sovereignty allows recovery of damages to private individuals. *Hawaii v. Standard Oil Co.*, 405 U.S. at 261; *North Dakota v. Minnesota*, 263 U.S. at 375-76.

The Arkansas River Compact does not change the nature of Kansas' quasi-sovereign interest in this case. The Compact settles disputes "between the States of Colorado and Kansas, and between citizens of one and citizens of the other State, . . . " Arkansas River Compact,

Article I-A. It does *not* purport to resolve disputes between the citizens of Kansas and the State of Colorado, and the 11th Amendment embodies "the background principle of state sovereign immunity" which precludes such claims. *Seminole Tribe*, 517 U.S. at 72. Any waiver of such immunity must be clearly expressed. *See Port Authority Trans-Hudson Corp. v. Feeney*, 495 U.S. 299, 305 (1990).

Second, the Master states that "the key case on this subject, *Texas v. New Mexico*, 482 U.S. 124 (1987), speaks broadly of providing a remedy for past breaches [of an interstate compact]." App. to Third Report at 34. The Master also relies heavily on the Court's statement in *Texas v. New Mexico* that, "[i]n *proper* original actions, the Eleventh Amendment is no barrier, for by its terms, it applies only to suits by citizens against a State." *Id.* at 35, *quoting Texas v. New Mexico*, 482 U.S. at 130 (emphasis added). However, as *North Dakota v. Minnesota* established, an original action may include a proper claim by a state and improper claims on behalf of individuals. *Texas v. New Mexico* simply determined for the first time that money damages could be awarded as a remedy for past breaches of an interstate compact. The Court did not address how the size of a monetary payment should be determined; that issue was remanded to the Special Master in that case for his recommendation, 482 U.S. at 132, and ultimately the states stipulated to a monetary payment. *Texas v. New Mexico*, 494 U.S. 111 (1990).

The Master also relies on the Court's statement (in response to the argument that money damages would not benefit the actual injured parties) that "the State should recover any damages that may be awarded, . . . " App. to

Third Report at 22, quoting *Texas v. New Mexico*, 482 U.S. at 132 n.7. By referring to "*any* damages that *may* be awarded," the Court did not determine that Texas could recover damages for losses suffered by individual farmers. Rather, it simply recognized that any damages that Texas recovered for its representation of the "general public interest," *id.*, could be spent by Texas as it saw fit. It would be a strange interpretation of the 11th Amendment to allow a state to recover money damages for losses suffered by individuals only if it decides to keep the money in the state coffers rather than aiding the injured individuals. Such an interpretation would also be inconsistent with the statement in *Texas v. New Mexico* that the state "would be free to spend [the money] in the way it determines is in the public interest." 482 U.S. at 132 n.7. Therefore, the applicability of the 11th Amendment must depend not on how the state ultimately spends any damages it may recover, but on the nature and origin of the claims on which damages are based.

Third, the Master reads the Court's Laramie River decisions[6] as doing "exactly what Colorado now says it cannot do" because the equitable apportionment of the Laramie River was based on the prior appropriations of individual water users. App. to Third Report at 27. The Laramie River cases, however, are consistent with the concept of quasi-sovereignty described above. Although the states' apportionments were based on use by their

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[6] *Wyoming v. Colorado*, 259 U.S. 419 (1922); *Wyoming v. Colorado*, 286 U.S. 494 (1932); *Wyoming v. Colorado*, 298 U.S. 573 (1936); *Wyoming v. Colorado*, 309 U.S. 572 (1940).

respective water users, they were not the *same* as those individual claims. The final decision made this clear by holding that the apportionment determined only the relative rights of the two States, *Wyoming v. Colorado*, 309 U.S. 572, 575-76 (1940), and that each state could determine in-state uses according to its own laws. *Id.* at 579, 580-81; *see also Connecticut v. Massachusetts*, 282 U.S. 660, 670 (1931). Thus, the states' apportionments were "independent of and behind," *see Snapp*, 458 U.S. at 604, those of their water users.

Fourth, the Master states that Kansas is the signatory to the Compact and the only party that can sue to protect the Stateline flows guaranteed for use by Kansas water users under the Compact. App. to Third Report at 36. He concludes that Kansas "would be a feeble representative" if it could not recover damages for losses suffered by individual farmers. *Id.* It is not clear why the Master believed that Kansas is the only party that could sue for a breach of the Compact. *See* Arkansas River Compact, Art. VII-A. In any case, Kansas is hardly a "feeble representative," even if it cannot recover losses suffered by individual water users. Kansas as *parens patriae* can sue to enforce compliance with the Compact, and the Court has the power to fashion a suitable remedy, which may include money damages. The Master's reasoning, however, ignores the principle of state sovereign immunity embodied in the 11th Amendment, which prevents individual water users from suing Colorado for damages. *See Seminole Tribe*, 517 U.S. at 72. The fact that those claims are barred does not allow Kansas to step in to recover those losses. *New Hampshire v. Louisiana*, 108 U.S. at 91.

In Section III, Colorado argues that even if losses suffered by individuals can be considered in determining the size of a monetary remedy for violations of the Compact, the Master failed to consider extenuating circumstances in this case; but, first, we address the Master's recommendation concerning prejudgment interest.

II. PREJUDGMENT INTEREST SHOULD NOT BE AWARDED ON KANSAS' UNLIQUIDATED CLAIM AGAINST COLORADO

In addition to its position that money damages should be awarded as a remedy in this case, Kansas argued that an award of prejudgment interest is necessary to provide complete compensation for injuries resulting from Colorado's violation of the Compact. App. to Third Report at 38. Colorado opposed such an award on the grounds that Kansas did not complain about a compact violation until 1984 at the earliest, thereafter there was a good-faith dispute over compact compliance, and the amount of any depletion was far from readily ascertainable. *See id.* at 38-39. Colorado noted that the common law rule is that prejudgment interest is not awarded on unliquidated damages and that prejudgment interest had not been awarded on judgments in cases between states, absent a clear obligation to pay interest. *E.g., Virginia v. West Virginia*, 238 U.S. 202, 234-35 (1915).

In his Second Report, the Master concluded that if the remedy were to include money damages, the unliquidated nature of Kansas' claim does not, in and of itself, bar an award of prejudgment interest. App. to Third Report at 43. In reaching this conclusion, the Master

relied heavily on the Court's decision in *City of Milwaukee v. Cement Div., National Gypsum Co.*, 515 U.S. 189 (1995). Colorado took an exception to this recommendation, which was overruled without prejudice. Since the Master has now recommended that prejudgment interest be awarded on Kansas' damages, it is now appropriate for the Court to consider Colorado's exception.

As the Master acknowledges, *City of Milwaukee* was an admiralty case, where the general rule has been to allow prejudgment interest. App. to Third Report at 41. The Master relies on the Court's observation that the distinction between liquidated and unliquidated claims "has faced trenchant criticism for a number of years." *Id.* at 39, citing *City of Milwaukee*, 515 U.S. at 197. However, the cases cited by the Court as examples of such criticism involved awards of prejudgment interest granted pursuant to statutory provisions. For example, *Funkhouser v. J.B. Preston Co.*, 290 U.S. 163 (1933), simply determined that a New York statute providing for prejudgment interest was not an unconstitutional impairment of contracts.

While there has been a trend in recent years to allow prejudgment interest on unliquidated claims, that trend has been primarily the result of legislative action. *Cf. Monessen Southwestern Ry. Co. v. Morgan*, 486 U.S. 330, 339 (1988) (denying prejudgment interest in FELA claims because of congressional inaction to change longstanding common law rule). The Court has found prejudgment interest to be appropriate to effectuate the purpose of federal remedial schemes, which typically include detailed enforcement provisions, including time limits for bringing claims. *See, e.g., Loeffler v. Frank*, 486 U.S. 549

(1988) (approving prejudgment interest in sex discrimination case against U.S. Postal Service); 42 U.S.C. § 2000-16(c) (imposing time limit for bringing such claims). Statutory provisions providing for prejudgment interest have also been accompanied by legislative changes placing other limits on liability. *See General Motors Corp. v. Devex Corp.*, 461 U.S. 648, 654-55 (1983) (noting that 1946 change in patent law providing for prejudgment interest contained corresponding change eliminating recovery for infringer's profits).[7]

As the Master recognizes, "Kansas' claim for damages in this case certainly represents an unliquidated claim." App. to Third Report at 43. Colorado's violation of the Compact was not willful or deliberate, *Id.* at 3-4, 6, and determining depletions of usable Stateline flows due to wells is a "complex matter." *Id.* at 3.

This Court found that the "vague and conflicting evidence" concerning the impact of increased well pumping on usable Stateline flows excused Kansas' failure to raise its claim until 1985. *Kansas v. Colorado*, 514 U.S. at 689. Further, the Court noted that it had not decided whether the equitable doctrine of laches should be applied in original actions to enforce an interstate compact, *id.* at 687, and there is no applicable statute of

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[7] *General Motors Corp.* also recited the common law standard (which the Court would presumably have followed in the absence of a statutory change), under which "prejudgment interest could not be awarded where damages were unliquidated, absent bad faith or other exceptional circumstances." 461 U.S. at 653.

limitations. Given the fact that depletions to usable Stateline flows are only now apparent with "hindsight and the benefit of sophisticated computer modeling," Third Report at 106, that determining depletions to usable Stateline flows has been extremely difficult (*see* Section III, *infra*), and that there is no time limitation on actions for violation of an interstate compact, this is not a case in which the Court should depart from the traditional rule against awarding prejudgment interest on unliquidated claims, absent bad faith or other exceptional circumstances, which are not present in this case.

III. THE MASTER'S RECOMMENDATIONS THAT AN AWARD OF DAMAGES SHOULD INCLUDE LOSSES SUFFERED BY INDIVIDUAL WATER USERS AND PREJUDGMENT INTEREST ON SUCH LOSSES IS FUNDAMENTALLY UNFAIR TO COLORADO AND IS INCONSISTENT WITH THIS COURT'S PRIOR DECISION EXCUSING KANSAS FROM MAKING A COMPLAINT ABOUT POST-COMPACT WELL PUMPING IN COLORADO UNTIL 1985

If the Court determines that the 11th Amendment does not bar recovery of losses suffered by individual water users and that prejudgment interest may be awarded on such losses, the size of an award should be reviewed carefully for fairness and equity, and factors in extenuation should be considered both in determining the size of an award of monetary damages for violation of the Compact and whether to award prejudgment interest on any or all such damages, just as this Court took into account factors in extenuation in determining whether Colorado should be held in contempt for violation of a

decree of this Court equitably apportioning the Laramie River. *Wyoming v. Colorado*, 309 U.S. 572, 582 (1940).

The Master concludes that the general lack of knowledge in the early years about pumping in Colorado and its impacts along the Arkansas River served to protect Kansas against a claim of laches and that the same degree of fairness should relieve Colorado of an obligation to pay prejudgment interest at the full interest rates on damages from depletions from 1950 through 1968, which, he states, "only with hindsight and the benefit of sophisticated computer modeling can be found to have occurred." Third Report at 106. However, the Master finds that "by 1968 Colorado knew, or should have known, that postcompact wells were causing material depletions of *usable* Stateline flows." *Id.* at 103 (emphasis added). The Master concedes it is "essentially correct" that Kansas did not register a formal complaint until 1985, but states "that is not to say that Colorado was unaware of the impact of its postcompact pumping until that time." *Id.* Relying on a 1968 study of surface diversions and groundwater pumping along the Arkansas River, known as the 1968 Wheeler Report (Jt. Exh. 92), the Master states that "Colorado had to know that the impacts on the other side of the Stateline in Kansas were no different." *Id.* at 104. Thus, he recommends that prejudgment interest, at the rates proposed by Kansas, be awarded on damages from 1969 to the date of the judgment. *Id.* at 107.

The Master's finding is inconsistent with the Court's ruling in 1995 that Kansas was not guilty of inexcusable delay in making its well pumping claim because of the "vague and conflicting evidence available to Kansas." 514 U.S. at 689. In effect, the Master has said that Kansas was

excused from making a complaint about post-Compact well pumping in Colorado until 1985 because of the difficulty of determining the impact of increases of post-Compact well pumping in Colorado on usable Stateline flows, but Colorado should be liable for all losses resulting from such increases, and should pay prejudgment interest on such losses beginning in 1969, even though it had no reason to know of any such impacts until at least 1968 and it was extremely difficult to determine such impacts after 1968. This recommendation is simply not fair.

A. The Difficulty of Determining The Impacts Of Ground Water Withdrawals Should Be Considered In Determining Whether To Award Damages And Prejudgment Interest On Damages

The difficulty of determining the impacts of ground water withdrawals is not limited to this case. The common law rule, still adhered to by some states, is that landowners had an unlimited right to withdraw ground water beneath their property because the movement of ground water beneath the earth was so mysterious that courts could not resolve disputes between parties regarding the impacts of withdrawals. *Roath v. Driscoll*, 20 Conn. 533, 541 (1850); *Acton v. Blundell*, 12 Mees and W. 324, 152 Eng. Rep. 1223 (1843). As the science of ground water hydrology developed, many states rejected the "absolute ownership" doctrine in favor of rules allowing "reasonable use" or correlative rights. Meyers, Tarlock, Corbridge, and Getches, WATER RESOURCES MANAGEMENT 596 (3d ed. 1988). These rules effectively placed limits on ground water withdrawals without generally requiring courts to determine facts concerning the rate or direction

of ground water movement in order to adjudicate disputes between competing claimants. As ground water usage became more prevalent, a distinction was often made between wells withdrawing ground water in defined underground channels, which was subject to the rules governing surface use, and "percolating ground water," which was governed by rules applicable to ground water. *Id.* at 592. These distinctions, which had little scientific basis, reflected the difficulties of proof in determining the rate and direction of ground water movement. *See In Re the General Adjudication of All Rights to Use Water in the Gila River System and Source*, 9 P.3d 1069 (Ariz. 2000) (recognizing that distinction between "subflow" and "percolating ground water" is not hydrologically based, but instead a legal definition adhered to for almost 70 years).

The development of the computer, which allowed hydrologists to solve efficiently the equations of ground water flow, led to the development of mathematical models that could simultaneously calculate the effects of pumping from wells on water levels and streamflow, and track such effects over time. *See* R. Allan Freeze and John A. Cherry, GROUNDWATER 352 (1979).[8] As is often the case, scientific advancements led to litigation over the impacts of earlier developments.

The Master recommends that Colorado be relieved of the obligation to pay full interest rates on damages

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[8] Dr. R. Allan Freeze was one of the pioneers in the application of computer models to ground water problems and testified as a witness for Colorado about the history of ground water modeling. *See* First Report at 232 and n.76.

because of the difficulties of proof. Third Report at 106. By recommending that prejudgment interest be awarded beginning in 1969, *id.* at 107, however, he fails to recognize that determination of the impacts from pumping on usable Stateline flows was extremely difficult after that date.

B. Colorado's Effort To Regulate Ground Water Withdrawals For The Benefit Of Senior Surface Water Rights In The 1970s Demonstrates The Difficulty of Determining The Impacts Of Ground Water Withdrawals At That Time

Part of the rationale for the Master's recommendation appears to be the fact that Colorado had limited state regulation of ground water. The Master states that prior to 1965 Colorado had no system for the regulation of ground water and that wells could be drilled without state permission and even without the state's knowledge. Third Report at 103. Nor, he says, were any reports required of the amounts pumped. *Id.* This is not entirely correct, but Colorado was hardly unique in having limited state regulation of ground water at that time.[9] The same was true in Kansas until 1978. *See* App. to Third Report at 2. However, the Master failed to take note of Colorado's continuing efforts to study and regulate ground water. In 1963 Colorado entered into a cooperative investigation with the U.S. Geological Survey to (1)

[9] In 1957, Colorado passed a law requiring permits to use ground water. Colo. Sess. Laws, ch. 289, § 5 (1957). First Report at 109.

inventory wells in the Arkansas River Valley, (2) document and evaluate the effects of development, (3) construct and verify an electrical analog model to aid in the evaluation of the hydrology, and (4) develop models and water-management plans. Jt. Exh. 66 (Colo. App. Item 1). *See* First Report at 158.

As part of the cooperative study, the U.S. Geological Survey developed an electric analog model[10] of the alluvial aquifer along the Arkansas River and a digital (*i.e.*, computer) model to evaluate water management plans (the Taylor-Luckey model). These efforts led to a series of papers and reports that were published in the 1960s, including the 1968 Wheeler Report, which were the basis of Colorado's argument that Kansas knew or should have known, at the latest by 1968, that the number of post-Compact wells and the amount of post-Compact pumping had increased, *see* First Report at 158, 159-60; yet the Master rejected Colorado's argument because the reports did not address the "impact on usable flow at the Stateline." *Id.* at 161. The Court affirmed the Master's conclusion, holding that the same reports constituted only "vague and conflicting" evidence which did not put Kansas on notice of an obligation to make its claim before 1985. *Kansas v. Colorado*, 514 U.S. at 688-689. If this evidence, including the 1968 Wheeler Report, was insufficient to alert Kansas to the need to make its claim, it was

[10] Electric analog models are based on the physical and mathematical analogy between electrical flow and ground water flow. Freeze and Cherry, GROUNDWATER 360. They were used as an alternative approach when digital computer models, which required large computers and relatively sophisticated programming expertise, were not readily available. *Id.*

also insufficient to establish that Colorado knew, or should have known, about the impact of post-Compact well pumping on usable Stateline flows, thereby obligating Colorado to pay damages for all losses that occurred as a result of post-Compact well development and prejudgment interest on such losses. Moreover, the Master failed to consider the fact that Colorado's efforts to regulate well pumping after 1969 were unsuccessful because of the difficulties of proof.

In 1974 the Colorado State Engineer proposed an amendment to rules and regulations to limit all pumping in 1976 and thereafter unless depletions caused by well pumping were replaced. First Report at 126. However, after a trial, the proposed amendment was not approved by the Colorado Water Judge, who made extensive findings that challenged some of the basic assumptions in the Wheeler Report and the Taylor-Luckey model. Among other things, the Water Judge found:

> Notwithstanding theoretical hydrological analyses that support the State's contention that wells have depleted surface flows in the Arkansas River, the Court finds no competent evidence in the record that stream flows have suffered in fact during the post-well period or that reductions, if any, can be traced to well diversions rather than to increased irrigation efficiencies, increased groundwater storage, phreatophyte and evaporation losses, stock ponds, municipal sewage lagoons and pot holes or changes in side channel inflows. . . .

Jt. Exh. 157, ¶ 17 (Colo. App., Item 2). The Colorado Supreme Court affirmed the Water Judge's decision.

Kuiper v. Atchison, Topeka & Santa Fe Ry. Co., 195 Colo. 557, 581 P.2d 293 (1978).

Eighteen years later, with the benefit of extensive new studies by both States regarding increases in phreatophyte growth, stock ponds, and changes in side channel inflow, as well as new computer modeling studies, the Master came to a different conclusion. First Report at 116, 228-90. Hindsight and the benefit of those new studies should not obscure the fact that in the mid-1970s the Colorado State Engineer was unable to prove, based on the evidence developed with the tools available at that time, that surface stream flows had suffered during the post-well period or that reductions, if any, were attributable to well pumping. Indeed, the Water Judge's decision provided direction to both states on other factors that needed to be considered before any conclusions could be drawn about the effects of ground water pumping on surface flows.

C. Kansas' Difficulty In Proving Its Case Further Demonstrates The Difficulty Of Determining The Impact Of Ground Water Pumping On Usable Stateline Flows

Even in 1990, Kansas had enormous difficulty proving its case. As the Master stated in his First Report, the H-I Model, which was developed by Timothy J. Durbin for Kansas to quantify the effects of individual causes of depletion, "represents an enormously difficult task, the complexities of which may not have been fully appreciated when Durbin began to develop the basic structure of the model." First Report at 230 (footnote omitted). The

Master also found that the Taylor-Luckey Model developed by the USGS in 1974 "was neither required nor intended to provide the level of accuracy and detail demanded in an adversarial trial." *Id.* at 231.

These findings, and the Master's findings about difficulties experienced by the Kansas experts after some five years of data collection and model development, First Report at 236-37, underscore the unfairness of holding Colorado liable for all losses that resulted from post-Compact well pumping since 1950, and prejudgment interest beginning in 1969. As the Master himself found in the Second Report in rejecting Kansas' argument that the measure of damages should be the greater of Colorado's gains or Kansas' losses:

> Although by the 1970s the extent of pumping in Colorado was a matter of common knowledge, that is not to say, as I concluded in my earlier report, "that the impact of such pumping on usable Stateline flows was generally known or understood." Report of Special Master at 169. Wells *per se* do not violate the compact. Only if they cause a material depletion in usable Stateline flows are they wrongful. Determining what flows are usable, and the depletions of usable flow in contrast to depletions of total flow, is a complex matter. And as the Supreme Court noted in its earlier Opinion, isolating the impacts of wells on usable Stateline flow was rendered all the more difficult because of other changing conditions during the 1970s and 1980s. The 1970s were generally dry years, and some reduction in flow would have occurred apart from pumping. Pueblo Dam came on line in 1976 and began to reregulate native flows. Transmountain imports were also increased during this period, which to some extent provided an offset to pumping. The Winter Water Storage Program was instituted. Finally, there was no quantitative or specific entitlement against which depletions to usable flow could be judged.

App. to Third Report at 3, citing *Kansas v. Colorado*, 514 U.S. 675 (1995).

If the Court accepts the Master's recommendation that Kansas' damages should include losses suffered by individual water users in Kansas, Colorado recommends that the Court reduce the amount of the damages by some fair percentage to reflect the fact that neither State knew, or had reason to know, that post-Compact well pumping was depleting usable Stateline flows until at least 1968 and that determining the impact of such pumping on usable Stateline flows after 1968 was extremely difficult. *Cf. Talbot v. Seeman*, 5 U.S. (1 Cranch) 1, 44 (1801). If prejudgment interest is awarded on such losses, Colorado recommends that prejudgment interest be awarded only beginning in 1985, the date when Kansas first made a formal complaint to the Arkansas River Compact Administration. By waiting to make a formal complaint until 1985, Kansas not only had the benefit of the USGS studies and Colorado's effort to curtail ground water withdrawals, but also significant advances in hydrologic computer modeling. Had Kansas brought its complaint in 1974, for example, proving the very existence, much less quantifying, depletions to usable Stateline flows would have been problematic; witness Colorado's lack of success during this period.

IV. THE MASTER'S RECOMMENDATION THAT PREJUDGMENT INTEREST SHOULD BE AWARDED ON DAMAGES SUFFERED BY INDIVIDUALS IN KANSAS AT THE INTEREST RATES PAID BY THE INDIVIDUALS, RATHER THAN AT THE INTEREST RATES RECEIVED BY THE STATE OF KANSAS, IS INCONSISTENT WITH THE BASIS ON WHICH KANSAS WAS ALLOWED TO BRING THIS SUIT AND IS UNFAIR TO COLORADO

Without significant discussion, the Master recommends that prejudgment interest be awarded on Kansas' damages at the rates proposed by Kansas. Third Report at 107. He notes that the Kansas experts used interest rates which reflected the opportunity costs *to farmers* to compound the losses attributable to farmers, *id.* at 94, which are by far the largest losses, but did not expressly address Colorado's argument that if prejudgment interest were to be awarded, the interest rates applicable to the State of Kansas, which are lower and were used to calculate prejudgment interest on tax losses to the State of Kansas, should be used instead. *Id.* The Master's recommendation that prejudgment interest be awarded at rates higher than those received on state revenues underscores the problems with his interpretation of Kansas' quasi-sovereign interests.

The Master acknowledges that the damages in this case will be paid, at least initially, to the State of Kansas, not to individual water users. App. to Third Report at 21-22. Indeed, he quotes from *Texas v. New Mexico*, where the Court, in response to counsel's argument that any

such damages might go into the state's general fund, "rather than benefit those who were hurt," responded:

> But the basis on which Texas was permitted to bring this original action is that enforcement of the Compact was of such general public interest that the sovereign State was a proper plaintiff. *See Maryland v. Louisiana*, 451 U.S. 725, 735-739 (1981). It is wholly consistent with that view that the State should recover any damages that may be awarded, money she would be free to spend in the way it determines is in the public interest.

Texas v. New Mexico, 482 U.S. at 132 n. 7, *quoted in* App. to Third Report at 21-22. The Master says: "It is the same situation here. Any damages will go to the State of Kansas, to be spent as it decides, and not to individual water users." App. to Third Report at 22.

Colorado agrees that it is the same situation here. But the Master fails to perceive the inconsistency of awarding damages to the State of Kansas, while using interest rates of the farmers as the basis to award prejudgment interest on damages that will be awarded to the State of Kansas. The Master's recommendation is fundamentally inconsistent with the basis on which Kansas was allowed to bring this action and is punitive and unfair to Colorado.

The State of Kansas was permitted to bring a suit for violation of the Compact because the State of Kansas as *parens patriae* has an interest apart from that of the individuals affected and which stands behind the rights of its citizens. *Maryland v. Louisiana*, 451 U.S. at 731-39; *Pennsylvania v. West Virginia*, 262 U.S. 553, 592 (1923). It is inconsistent with the Master's theory of quasi-sovereignty to

use the interest rates experienced by the water users as the basis for awarding prejudgment interest on damages awarded to the State of Kansas. Payment of damages to Kansas rather than to individual water users was the Master's sole reason for distinguishing *North Dakota v. Minnesota*, which would otherwise bar recovery of those individuals' losses. Using the water users' interest rates in fact contradicts the Master's reasoning that Kansas was not simply advancing individuals' claims.

The traditional reason that courts did not award prejudgment interest on unliquidated damages was the perceived unfairness to the defendant, who could not tender payment of a specific sum to the plaintiff to stop the accumulation of interest. App. to Third Report at 39. The Master has acknowledged that until 1968, neither State knew nor had reason to know that post-Compact well pumping in Colorado was causing depletions to usable Stateline flows in violation of the Compact. Third Report at 106. Therefore, until at least that time, Colorado had no reason to set aside a sum of money to pay damages or to tender a sum to Kansas to stop the accumulation of interest. Even as of 1969, Colorado had no way of knowing the amount of such depletions.

But, even assuming that, in spite of all of the uncertainties, Colorado had set aside money beginning in 1969 for the payment of damages to Kansas or tendered to Kansas an amount for payment of damages, the interest rates received on such monies would have been at the rates received on state government revenues, not the interest rates paid by farmers in Kansas. In this case, given both the difficulty of determining the amount of depletions to usable Stateline flows and the constitutional

limit on the recovery of individual losses by states, it is fundamentally unfair to award prejudgment on Kansas' damages at the interest rates paid by farmers. Colorado did not earn interest at those rates on money that will be used to pay damages and Kansas would not have received interest at those rates if the damages had been received at an earlier date. To use the interest rates of farmers to award prejudgment interest, which are higher than rates received on state revenues, is punitive rather than compensatory, and the facts of this case simply do not justify a punitive award of prejudgment interest.

V. THE CROP PRODUCTION LOSSES ESTIMATED BY THE KANSAS EXPERTS ARE NOT REASONABLE AND THE MASTER'S RECOMMENDATION TO AWARD THESE LOSSES TO KANSAS SHOULD NOT BE ACCEPTED BY THE COURT

The Master notes that the largest component of the Kansas damage claim is based upon crop production losses due to surface water depletions. Third Report at 45. The losses relate to the lands within the ditch service areas in Kansas irrigated by surface water only. *Id.* In 1950, the acreage irrigated by surface water only was approximately 29,000 acres of some 50,000 acres irrigated in the ditch service areas. *Id.* This acreage declined steadily over time as more wells were developed in the ditch service areas. *Id.* By 1994, the total acreage irrigated by surface water in the ditch service areas had declined to 44,000 acres, and the acreage irrigated by surface water only had declined to 8,709 acres. *Id.* at 7, 45. The number of wells in the ditch service areas had correspondingly increased from 282 in 1950 to 618 in 1988. *Id.* at 45.

The amount of the depletions to farm headgate deliveries of lands irrigated with surface water only was agreed to in the Stipulation between the States. Third Report at 8-9. The total amount of those depletions was 72,036 acre-feet, *id.* at 9, which was almost exactly one-half of the depletions to farm headgate deliveries that were replaced by additional pumping by wells in the ditch service areas (154,526 acre-feet). *Id.* Looked at from another perspective, only 17 percent of the total depletions to usable Stateline flows during the period 1950-1994 (72,036 acre-feet of 420,070 acre-feet) were reductions to farm headgate deliveries that would have resulted in crop production losses on surface water only lands.

It was therefore troubling that 72% of the Kansas claim for damages, with prejudgment interest, was based on crop production losses on the surface water only lands ($45.1 million of $62.4 million). Third Report at 1, 45. Not only did this seem surprising because of the small amount of the depletions to farm headgate deliveries of lands irrigated by surface water only; but, until 1977, any farmer in the Kansas ditch service areas could have drilled a well to obtain additional water, and many did. Third Report at 60; First Report at 225. This Court pointed out the availability of inexpensive ground water underlying the ditch service areas in 1943 in *Colorado v. Kansas*:

> As has been pointed out, despite Colorado's alleged increased depletions, the acreage under irrigation in western Kansas through existing ditches has steadily increased, over the period 1895-1939, from approximately 15,000 acres to approximately 56,000 acres. Moreover, the arid lands in western Kansas are underlaid at shallow depths with great quantities of ground water available for irrigation by pumping at low initial and maintenance cost. There is persuasive testimony that farmers who could be served from existing ditches have elected not to take water therefrom but to instal [sic] pumping systems because of lower cost.

320 U.S. at 399.

The trend in increasing use of ground water in southeast Kansas continued after the Compact was adopted.[11] Thus, the magnitude of the crop production loss damages on the surface water only lands raises a fundamental question about the Kansas damages claim: If crop values were as high as the Kansas experts estimated, why didn't every farmer in the ditch service areas drill a well to pump additional ground water?

As the Master states, the Kansas approach to estimating crop losses and lost income was "unexpectedly simple." Third Report at 47. Rather than collecting records of crop yields for representative farms irrigated by surface water only, the Kansas experts relied on linear crop yield – evapotranspiration (ET) relationships developed from research studies on experimental farms. *Id.*[12]

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[11] Pumping in the entire regional area in Kansas, including the ditch service areas, increased from about 77,000 acre-feet in 1951 to about 718,000 acre-feet in 1988. App. to Third Report at 72. The acreage irrigated in the entire area increased from approximately 66,000 acres in 1949 to 351,000 acres by 1979. First Report at 221.

[12] The Master says that research studies have shown a linear relationship between crop yield and ET. However, as

The Master discusses Colorado's criticisms of the crop yield-ET coefficients used by the Kansas experts but says these are highly technical issues and were refuted by Professor Stone. Colorado will not trouble the Court to review the testimony on the technical issues because Colorado has a more basic objection to the Master's recommendation. The Kansas analysis implies very high values of water for irrigating alfalfa, grain sorghum, and winter wheat, values that are unreasonable when compared to the low cost of installing and operating a well to provide supplemental water for either these crops or the higher value crop of corn. These comparisons suggest that Kansas' "unexpectedly simple" approach to estimating crop losses was in fact deceptively simple, failing to account for other variables that affect crop production, and thus are inappropriate for the purpose of estimating losses to farmers who did not have well water.

One of Colorado's experts was Professor Richard M. Adams, who is a professor of agricultural and resource economics at Oregon State University and, as the Master notes, has served as a consultant to the U.S. Environmental Protection Agency. Third Report at 62 n. 16. Of particular note is the fact that the issue on which Professor Adams has served as a consultant to EPA is the assessment of crop losses due to air pollution, and specifically losses due to ozone, which is a highly contested issue. RT Vol. 200 at 34-35, 43-44 (Colo. App., Item 4).

Professor Adams focused on the values of water implied in the analysis by the Kansas experts. First, he

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Colorado's experts pointed out, weather, disease, and pests can dramatically reduce the marketable yield of crops, regardless of the amount of evapotranspiration. Third Report at 52.

calculated the acre-foot value of water in the Kansas analysis and then compared those values of water to other economic studies reporting values of water for production of irrigated crops. Third Report at 62. Although estimates of water values can be affected by a variety of factors, he stated that one expects central tendencies in the estimates, and comparison of results with those from similar studies is a standard procedure in scientific research and the peer review process for publication in scientific journals. Colo. Exh. 1203 at 1 (Colo. App., Item 3). Based on his review of the per acre-foot values for water from a number of studies at various locations across the western United States, Professor Adams concluded that, using the most conservative method for calculating the Kansas values of water, the Kansas values were three to four times higher than the values found in the literature for these crops. Colo. Exh. 1203 at 7 (Colo. App., Item 3); Third Report at 63.

Second, Professor Adams compared the value of the water to the cost to pump ground water in the ditch service areas. Third Report at 60. For example, in the Kansas analysis the value of an additional acre-foot of water delivered to surface water only lands in 1950 was $42. RT Vol. 208 at 50 (Colo. App., Item 9); Colo. Exh. 1203, Table 2 (Colo. App., Item 3). The cost to pump an acre-foot of ground water in 1950 from a deep (*i.e.*, Ogallala aquifer) well powered by natural gas in the Amazon Ditch service area in the original Kansas Report was only $3.77, or less than 10 percent of the value of the water. *Id*. Based on that comparison Professor Adams said it struck him as "extremely odd that the farmers would not have drilled wells given that differential between potential profit and the cost of pumping water." RT Vol.

208 at 49-51 (Colo. App., Item 9)[13]. Throughout the period when wells could be drilled in Kansas (1950-77), the value of water in the Kansas analysis was nine to twenty times higher than the cost to pump ground water. *Id.* at 67. As Professor Adams testified, farmers are astute and would not have foregone the opportunity to increase their incomes by drilling wells if the value of water was as high as the Kansas analysis implies. *Id.* at 67-69.

The fact that more than 8,700 acres in the ditch service areas continued to be irrigated only with surface water reinforced Professor Adams' conclusion that the crop production losses estimated by the Kansas' experts on those lands were too high. Colo. Exh. 1203 at 8 (Colo. App., Item 3).

The Master rejected Professor Adams' comparison of the values of water in the Kansas analysis and values of water in the literature on the basis that Professor Adams acknowledged that the Kansas analysis involved a "short-short run" or "intra-seasonal" situation, which would generally be higher than the values of water reported in other situations. Third Report at 63. He cited to a recent two-year transfer of water between the Palo Verde Irrigation District and the Metropolitan Water District in California at $143 per acre-foot and stated that James Lochhead, the former Director of the Colorado Natural Resources, testified that the cost of acquiring water in the

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[13] A deep well powered by natural gas in the Amazon Ditch service area was used for comparison because this example was presented in the Kansas Report, Kan. Exh. 892, Table A14, and because wells in the Amazon Ditch service area had the greatest historical pumping lifts, at least in the 1950s. *See* RT Vol. 204 at 122-23 (Colo. App., Item 7).

Arkansas River Basin might be higher than the $143 per acre-foot figure used in the California transfer. *Id.* at 63-64.

The Master has cited this evidence out of context. Professor Adams did acknowledge that the literature values he had cited were not "intra-seasonal" values, but noted that there were very few studies of "intra-seasonal" values, and said that whether the "intra-seasonal" values would be higher was an empirical question. RT Vol. 200 at 121-22 (Colo. App., Item 5).[14] He testified that most of the values he had obtained from the literature were based on well water, which would be higher than the value of unregulated surface water in Kansas, and were therefore appropriate for comparison. *Id.*; RT Vol. 208 at 69-70 (Colo. App., Item 9); *id.* at 97-99 (Colo. App., Item 10).

The transfer by the Palo Verde Irrigation District to Metropolitan Water District (which supplies water to Los Angeles and San Diego) was for *municipal* use and does not reflect the price that *farmers* would be willing or able to pay for water for low-value crops such as alfalfa, grain sorghum, or winter wheat. *See* RT Vol. 208 at 59-63 (Colo. App., Item 9). In the Arkansas River Valley in Colorado, water is sold for agricultural use for $8.00 to $10.00 an

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[14] Professor Whittlesey described the value of water in the Kansas analysis as a "short-short run situation" or "intra-seasonal" because the farmers had already planted crops and generally cropped all their acreage. Therefore, except for the cost to apply additional water and harvest the additional yield, they had made all their investments. But the higher the "intra-seasonal" value of water, the more incentive a farmer has to drill a water well to realize that value. The surface water only lands were not just occasionally short of water, they were water short every year. Third Report at 46.

acre-foot. Second Report at 50. Mr. Lochhead did not testify that the cost of acquiring water in the Arkansas River Basin might be higher than the $143 per acre-foot figure used in the California transfer. The statement was taken from a memorandum prepared by Mr. Lochhead and related to the fact that in a very dry year, if Colorado had to purchase water at rates comparable to municipal users, the price to purchase water for repayment might be higher than $143 an acre-foot. Mr. Lochhead never testified that this was the average price Colorado would have to pay for water or that $143 was a price that farmers could afford to pay for water. Indeed, the Master noted in his Second Report that the current price of replacement water in Colorado was $8.00 to $10.00 per acre-foot. Second Report at 50.

On the comparison of Kansas' implied value of water and the low cost to pump ground water, the Master states: "Given the hindsight of present day economists, it might have been profitable for everyone to drill supplemental wells in those early years. However, there are many reasons why this may not have been done, and the failure to drill wells does not by itself indicate that Kansas' estimates of crop losses is too high." Third Report at 60. He then lists various reasons why farmers may not have drilled wells, such as "[t]he favorable economics of drilling wells may not have been understood at the time." *Id.* at 60-61. It should be noted that Kansas did not call a single farmer who irrigated with surface water only to explain why they had not drilled wells. Rather, those were reasons offered by Kansas' economists.

With all due respect, Colorado believes that the substantial difference between the value of water in the Kansas analysis and the cost to pump ground water is

highly relevant and does indicate that the Kansas estimates of crop losses on surface water only lands are unreasonable. In 1943, this Court noted that the lands in western Kansas "are underlaid at shallow depths with great quantities of ground water available for irrigation by pumping at low initial and maintenance cost." *Colorado v. Kansas*, 320 U.S. at 399. The Court noted that there was "persuasive testimony that farmers who could be served from existing ditches have elected not to take water therefrom but to install pumping systems because of lower cost." *Id.*

Colorado does not believe that it is reasonable to suggest that in the 1950s and 1960s the "favorable economics of drilling wells may not have been understood at the time" or that "[q]uality information regarding costs and returns was not readily available." Third Report at 60. The favorable economics of drilling wells was pointed out by this Court in 1943. There may have been reasons why an individual did not drill a well, but, as Professor Adams said, it simply does not make sense that over a period of 28 years (1950-1977), farmers would not have drilled wells to irrigate some 8,700 acres in the ditch service areas if the values of water in the Kansas analysis were correct. RT Vol. 208 at 67-68 (Colo. App., Item 9).

The crop production losses estimated in the Kansas analysis should be rejected by the Court as the basis to award damages to Kansas. They are an unreasonable and inequitable basis for awarding damages to the State of Kansas for losses to individual water users – individuals who are not before the Court – particularly if such losses are compounded by prejudgment interest.

CONCLUSION

Colorado recommends that its exceptions to the Special Master's Third Report be granted and that the case be remanded to the Master for completion of the remedy phase consistent with the Court's opinion.

Respectfully submitted,

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Appendix Item 1

Excerpts from Joint Exhibit 66
(pages 1-2, 4-5)

COLORADO WATER
CONSERVATION BOARD
BASIC-DATA RELEASE NO. 21 (1970)
[Pages 1-2, 4-5]

HYDROGEOLOGIC DATA FOR THE LOWER ARKANSAS RIVER VALLEY, COLORADO

BY THOMAS J. MAJOR, R. THEODORE HURR,
AND JOHN E. MOORE U.S. GEOLOGICAL SURVEY

PREPARED BY THE UNITED STATES GEOLOGICAL
SURVEY IN COOPERATION WITH THE
COLORADO WATER CONSERVATION BOARD
AND SOUTHEASTERN COLORADO WATER
CONSERVANCY DISTRICT DENVER, COLORADO

1970 ABSTRACT

Ground-water use as a supplemental irrigation supply in the Arkansas River valley increased substantially between 1950 and 1965. During this 15-year period about 1,000 wells were drilled. Withdrawal of ground water by wells increased from 31,000 to 185,000 acre-feet annually in this period. The annual average withdrawal was 65,400 acre-feet for the first 5 years and 144,000 acre-feet for the last 5 years. This report presents the basic data collected during the inventory of the water resources of the reach of the valley from Pueblo to the Kansas State line. It includes maps showing the location of large-capacity irrigation, public supply, and industrial wells, records of well construction and yield, chemical analyses of ground water, water-level measurements, and well logs. Records of 1,348 irrigation wells and 119 public supply and industrial wells are included.

INTRODUCTION

An investigation of the water resources in the Arkansas River valley was begun in 1963 in cooperation with the Colorado Water Conservation Board and Southeastern Colorado Water Conservancy District. The purpose of the study is to make a comprehensive evaluation of the hydrology of the valley and to provide basic information to water users and state and local agencies for the planning, management, and administration of the water resources. The approach is to (1) inventory the water resources, (2) document and evaluate the effects of development, (3) construct and verify an electrical analog model to aid in the evaluation of the hydrology, and (4) develop models and test water-management plans.

PURPOSE AND SCOPE

This release presents the basic data collected during the inventory of the water resources of the Arkansas River valley. The release includes maps (plates 1 through 4) showing the location of large-capacity (yield greater than 100 gallons per minute) irrigation, public supply, and industrial wells that withdraw water from the valley-fill aquifer. In addition, the maps show the location of test holes, observation wells, stock wells, and domestic wells used to determine the physical character, saturated thickness of the valley-fill deposits, and seasonal fluctuations of the water table. Records of large-capacity wells, observation wells, and water levels are presented in tables 3, 4, and 5. Chemical analyses of water from selected wells and logs of test holes drilled in the valley fill are given in tables 6 and 7.

The information contained in this report has been used to construct and calibrate an electrical analog model of the Arkansas River valley and forms the basis for interpretive reports which will follow. The analog model of the Arkansas River valley was constructed at the U.S Geological Survey's Analog Model Unit in Phoenix, Ariz. It has been used to evaluate the relation between the stream and valley-fill aquifer (Moore and Wood, 1967). The model is being used at present (1970) to test alternate plans for improved utilization of both the ground- and surface-water supplies.

This report should be useful to land owners and drillers who are contemplating drilling a new well. Records of wells near a proposed well site can be studied to predict conditions likely to be encountered when drilling a new well.

DESCRIPTION OF AREA

The report area is a 150-mile reach of the Arkansas River valley extending from Pueblo to the Kansas State line. The report contains hydrogeologic data for the valley-fill aquifer which is adjacent to, underlies, and is in hydraulic connection with the Arkansas River. The aquifer consists of unconsolidated deposits of gravel, sand, silt, and clay. It ranges from 1 to 14 miles in width and covers an area of about 500 square miles in parts of Pueblo, Otero, Crowley, Bent, and Prowers Counties.

The aquifer fills a U-shaped trough cut into the bedrock, which consists of shale, limestone, and sandstone of Cretaceous age (table 1). The relation of the valley-fill aquifer to the bedrock is shown on the diagrammatic

section (back cover). Recharge, movement, and discharge of ground water from the valley-fill aquifer is also shown on the section. About 2 million acre-feet of water is stored in the valley-fill deposits.

METHODS OF STUDY

Information in this release is based on data collected from 1963 to 1968 and on previous studies. Records of 1,348 irrigation wells and 119 public supply and industrial wells were obtained during the investigation; all known large-capacity irrigation wells are included. As of December 1968, 137 of the irrigation wells were not equipped with a pump. Information on well location, depth to water, depth of well, lithology, discharge rate, days pumped, and acreage irrigated was collected for most of the irrigation wells.

* * *

A network of 965 observation wells was established to provide data for construction of hydrologic maps and to monitor changes in storage in the valley-fill aquifer. Water levels in these wells are measured twice yearly (spring and fall). The spring measurement is made in March or April before irrigation-well withdrawal begins and the fall measurement is made in October or November after withdrawal has stopped. The network consists of 608 irrigation wells, 197 stock and domestic wells, and 160 Geological Survey observation wells. The observation wells were installed where there were no existing wells and where additional control was needed.

Ground-water withdrawal by large-capacity wells was estimated from electrical and natural-gas power data. Information on power use by large-capacity wells

was obtained from gas and electric companies serving the Arkansas Valley, from city officials, and from individual well owners. Since 1964, most of the electric and gas meters on irrigation wells have been read during the spring and fall measurements; these readings provide the major source of data to compute ground-water withdrawal.

Information on the geology and hydrology of the valley-fill aquifer was obtained by drilling test holes and from drillers' logs. The test holes were drilled both by contractors and by the Geological Survey. The drilling and logging of the holes was supervised by personnel of the Geological Survey. Representative lithologic logs obtained from 577 test holes are shown in table 7. Drillers' logs are on file for most of the irrigation wells (see Remarks column, table 3).

A water-quality sampling network was established in 1967. Samples of water are collected and analyzed from these wells each year and published in Water Resources Data for Colorado. Part 2, Water Quality Records (U.S. Geol. Survey, 1967). Records of the wells that are sampled yearly are in table 3. The results of analyses of samples from 154 wells collected and analyzed in September 1964 are shown in table 6.

DEVELOPMENT OF GROUND-WATER SUPPLIES

Ground-water supplies in the Arkansas River valley are obtained from wells tapping the valley-fill deposits or the Dakota Sandstone. A summary of the geologic units and their hydrologic character is given in table 1. The Dakota Sandstone yields water to domestic and public

supply wells in parts of the valley. Wells tappling this aquifer yield as much as 100 gpm (gallons per minute), but the average yield is only 20 gpm. The hydrology of the Dakota Sandstone is not discussed in this report; however, information on this aquifer can be found in reports by Voegeli and Hershey (1965) and Weist (1963, 1965).

The valley-fill deposits are the principal source of water for irrigation and public supply wells. Wells tappling these deposits yield as much as 3,150 gpm; average yield is about 650 gpm. Ground water from the valley-fill aquifer has been developed to supplement surface-water supplies which often are inadequate at the beginning and near the end of the irrigation season. The surface-water supply was developed between 1860 and 1900. The ground-water supply was developed mainly from 1950 to 1965 (figs. 1, 2). During this 15-year period about 1,000 large-capacity irrigation wells were drilled in the Arkansas Valley. Since 1965, there has been a substantial reduction in the rate of well installation. Only 22 new wells have been drilled because of recent restrictions placed by the State of Colorado. There were 1,348 large-capacity irrigation wells in the valley in December 1968.

An increase in ground-water withdrawal has occurred concurrently with the increase in the number of wells. Withdrawal of ground water increased from 31,000 to 185,000 acre-feet annually in the period 1950 to 1965 (fig. 3; table 2). The average annual withdrawal was 65,400 acre-feet for the first 5 years and 144,000 acre-feet for the last 5 years. A detailed tabulation of ground-water withdrawal in each county from 1964 to 1968 is given in table 2.

Hydrographs of these observation wells (fig. 4) show that the magnitude of the water-level changes varies with the density of irrigation well development. The upper and lower hydrographs are from areas where the density is 2 wells per square mile, whereas the middle hydrograph represents an area where the density is 6 wells per square mile. In general, water levels in the Arkansas Valley are highest in the spring and lowest in the fall. Although water-level declines in observation wells between spring and fall have been as much as 15 feet, the average seasonal change for the entire valley is normally less than 3 feet. The water levels for the past 7 years show no major rise or decline.

* * *

Appendix Item 2

Excerpts from Joint Exhibit 157
(pages 1, 5-21, 31, 32)

IN THE DISTRICT COURT IN AND FOR

WATER DIVISION NO. 2

STATE OF COLORADO

CASES NOS. W-4079, W-4080, W-4083, W-4084 and W-4085

IN THE MATTER OF AMENDMENT OF THE RULES AND REGULATIONS GOVERNING THE USE, CONTROL AND PROTECTION OF SURFACE AND GROUND WATER RIGHTS LOCATED IN THE ARKANSAS RIVER AND ITS TRIBUTARIES	)
PROTESTANT: ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY W-4079	) FINDINGS OF FACT, CONCLUSIONS OF LAW AND JUDGMENT AND DECREE
PROTESTANT: STRATMOOR HILLS WATER DISTRICT W-4080	)
PROTESTANT: SECURITY WATER DISTRICT W-4083	)
PROTESTANT: COLORADO WATER PROTECTIVE AND DEVELOPMENT ASSOCIATION W-4084	)
PROTESTANT: AMERICAN CRYSTAL SUGAR COMPANY W-4085	)

The above matters came on for consolidated trial to the Court on March 12, 13, 14, 17, 18, 19, May 19, 20, 21, 28, 29, 30, October 21, 22 and 23, 1975, pursuant to C.R.S. 1973 37-92-501 (2) (h) on various Protests to a proposed Amendment (herein called "the "Amendment") to Rule 3 of the Rules and Regulations of the State Engineer Governing the Use, Control and Protection of Surface and Groundwater Rights on the Arkansas River and its tributaries (herein called the "1973 Rules").

C. J. Kuiper, State Engineer, Proponent of the Amendment, was represented by James D. Geissinger and Donald H. Hamburg, Special Assistants Attorney General, acting for the Attorney General of Colorado.

• • •

The Court, being fully advised in the premises, having heard and reviewed the evidence and having heard the arguments of counsel on October 28 and 29, 1976, makes the following Findings of Fact, Conclusions of Law and enters the following Judgment and Decree.

FINDINGS OF FACT

1. These proceedings were brought by all Protestants pursuant to Section 37-92-501(2) (h), and in the manner provided by Section 37-92-304, 1973 C.R.S., to protest the validity of a proposed Amendment to Rule 3 of the Rules and Regulations adopted by C. J. Kuiper, State Engineer of Colorado, dated November 16, 1972 and effective February 19, 1973, applying to the use of waters of the Arkansas River and its tributaries.

2. The 1973 Rules, governing the use of ground water in the Arkansas River Basin, were promulgated by the State Engineer on November 16, 1972 and became effective on February 19, 1973 (State Ex. R). They permitted all well owners who were subject to the rules and had filed applications for adjudication of their appropriation rights in the Water Court prior to June 30, 1972, to pump of right for not less than three days each week and for additional periods in high water years as the State Engineer might from year to year allow. According to the testimony of the State engineer, these rules were promulgated on the basis of studies by Harlan Erker and Jeris Danielson, Deputy State Engineers, and were believed to be consistent with directions of the legislature and the best interests of the State, viz. that existing uses of groundwater be recognized to the fullest extent possible. They involved a regulative pattern similar to the four-day-on, three-day-off regimen on the South Platte River that was approved by the Colorado Supreme Court in *Kuiper v. Well Owners Conservation Association*, 176 Colo. 119, 147 (1971). No protest was filed to the 1973 Rules. They remain in effect according to their terms until amended as prescribed by law (State Ex. R).

3. The Amendment was proposed on January 4, 1974, with an effective date of March 27, 1974 unless stayed pending hearings under C.R.S. 1973, 501(2) (State Ex. W). It directed that all pumping be limited to two days a week in 1974, to one day a week in 1975 and to zero days a week in 1976 and thereafter (State Ex. S). It made no exception for wells that could pump from time to time in priority, for diversions by wells that have an uninterrupted regimen of pumping for more than 18

years, for diversions by wells causing no material injury to any vested senior right in Colorado, for diversions by wells at times when no appropriator with a vested senior right has need for water or calls for delivery of water to his diversion facility, or for diversions by wells in excess of quantities that must be curtailed to fill the needs of all vested senior rights that make a call. The Amendment was stayed by Order of May 30, 1975, until final determination of the present proceeding.

4. The Arkansas River arises in the mountains of central Colorado and flows southeasterly to the State line, being joined between Canon City and the State line by a number of tributaries, including the Fountain, Adobe, Horse, and Big Sandy Creeks and the St. Charles, Huerfano, Apishapa, and Purgatoire Rivers (State Exs. J and E-2, pp. 5-8). The flows in the Arkansas River and its tributaries fluctuate erratically both seasonally and from year to year. Water for the satisfaction of the priorities of the River system comes from a variety of sources, including flow of the river from snowpack and rains in the mountains, precipitation, side stream inflow, accumulated ground water, surface return flow from irrigation by both surface and ground water sources, seepage and percolation of ground water. Normal yearly surface flows are relatively low during the spring months, rise as the snowpack in the mountains melts in May and June, then fall dramatically in mid or late July when the runoff from melting mountain snow ends. Flows in August and September are generally quite low, being limited to return flows from irrigation and side-channel inflows from local shower activity (State Ex. E-2, p.5).

5. Between Pueblo and the State line the Arkansas River meanders across an alluvial fill which ranges from a mile to 10-12 miles in width and from zero to 250 feet in thickness. The water table within the alluvial fill ranges from close proximity to the surface to as much as 100 feet below the surface. The material is charged by percolation from the surface and from the river and drains downslope toward and along the river in the direction of its flow. An estimated two million acre feet of water is generally held in transient storage within the alluvial material. Estimates of the amount of this water which is economically recoverable for irrigation range from 450,000 acre feet to 700,00 acre feet.

4. Principal ditches in the Arkansas Valley are located along the peripheral edges of the alluvial basin throughout a substantial part of its configuration (Protestants Ex. 8-1 to 8-4). Between these ditches and the river, lands historically irrigated through such ditches overlie significant portions of the alluvial material and have direct access to the water in transient storage therein (State Ex. D-1 to D-4; Protestants Exs. 13-1 to 13-4). There is no evidence that the quantity of irrigated acreage overlying the alluvium has materially changed in recent years. Several major ditches, e.g., Fort Lyon, Bessemer, Catlin, Rocky Ford Highline and Otero Extend beyond the limits of the alluvium (Protestants Exs. 8-A to 8-D; State Ex. E-2, Table 1). Lands served by these ditches beyond the limits of the alluvial fill have no direct access to alluvium groundwater.

7. In early years irrigation was accomplished primarily by use of surface waters delivered through the ditches, in accordance with their respective priorities, and

released down laterals to the lands they served. From the early part of the twentieth century, however, wells were dug to reach and use water in the alluvium, where available, to supplement the ditch decrees. In this way water would be provided to overlying lands after the spring runoff had ended and the river supplies were gone. The number of such wells rapidly increased subsequent to the early 1950's as a consequence of drought conditions and concurrent availability of inexpensive electrical power in the rural area. By 1956 prior to the first well registration statutes (C.R.S. 1953, 147-19-2), the number of high capacity irrigation wells, (that is, those with a capacity of 100 gallons per minute or more) reached 672; through 1968 (the year preceding the Water Right Determination and Administration Act of 1969), the number reached 1,447; and through 1972 the number reached 1,477 (State Ex. I, Table 6). Based on estimates from electric meter readings during the period 1966-1972, before any implementation of the 1973 Rules or other well regulation, total well diversions averaged 154,700 acre feet per year (State Ex. I, p. 21).

8. Some irrigators with early decreed well rights, such as Protestants' witness John A. Werme, Jr., do not have ditch rights. Their lands have been irrigated historically from groundwater sources from times long prior to well registration, administration or regulation. A substantial part of the groundwater appropriators, however, hold lands under major ditches and own stock and water rights in such ditches (State Ex. E-2, Table 10, and data collected by the Association for use in the augmentation plan prepared for its members, Protestant Exs. 7, 9). John A. Werme, Jr., the Secretary-Treasurer of the Colorado

Water Protective and Development Association, estimated that no more than 20% of the wells of Association members along the Arkansas River are used independently of surface diversions and a substantial number of these are used for domestic, municipal, industrial and other non-irrigation purposes. Membership records of the Association tended to corroborate that estimate.

9. The Arkansas River as a whole is overappropriated and shortages frequently occur on surface decrees, including those of early priority dates, before the runoff commences in the spring and during the late summer months after the runoff has ended. The evidence is uncontroverted that irrigation wells are now used where available to overlying owners to supplement surface decrees when surface supplies are short. Thus, wells are pumped in the spring before the runoff begins in order to start crops. Without supplemental groundwater in the spring, seed loss may be experienced from lack of soil moisture necessary for germination. Wells are also pumped in the late summer and fall when surface water supplies are not adequate to "finish" crops and lack of well water at this time reduces crop yields. Such a regimen of conjunctive use of well and river water has developed uniformly throughout the Arkansas Basin over a substantial time period, and now appears to have the acquiescence if not the support of a substantial part of the irrigation economy in the basin.

10. Conjunctive use has increased the quantity of water available to irrigated lands as a whole. The USGS (Taylor-Luckey) computer analysis of the Arkansas Basin (State Ex. Q) concludes that conjunctive use has increased total water beneficially used for irrigation by some

113,000 acre feet per year and that if wells stabilize irrigation supplies since they intercept return flows and make them available as needed in the late summer period without waiting for them to be returned to the river. The use of wells in the Arkansas Valley has made water available in the early spring and late summer and fall periods when water is needed for irrigation but would not otherwise be available from surface diversions. The State Engineer acknowledged that such use constitutes a sound management practice. The Amendment will significantly curtail such conjunctive use and, as a consequence, will materially reduce the beneficial use of the waters of the Arkansas Basin.

11. The water in the alluvium is hydraulically connected to the river. Well diversions create cones of depression in the alluvium, alter the elevation and slope of the water table and, if not counteracted by other hydrological events, change the size and rate of river gains from, and losses to, the alluvium. While the quantitative effect of well pumping on river flows is controverted in the evidence, there appears to be no dispute that well pumping depletes the river system (i.e., the surface stream and associated aquifer) over time in an amount which is equal to the consumptive use of well water and that the changes in the water table that accompany such depletions reduce system losses from evaporation and evapotranspiration of phreatophytes. The depletive effects of groundwater withdrawals on the stream itself cannot exceed the consumptive use of well-water less such consequential reductions in phreatophyte and evaporation losses, but the timing and size of such

effects and offsetting countereffects appear to depend upon a number of complex hydrological variables.

12. The time at which depletion to the surface stream occurs, if at all, varies with the character of the aquifer material, the location of wells in relation to the stream, the seasonal periods during which the wells are used (State Ex. H) and the timing of various counteracting forces. In general, wells averaging one mile from the river will have no impact on the river until approximately 30 days following commencement of pumping and will not have a peak impact for about 170 to 175 days (State Ex. H). Wells closer to the river can produce a response in shorter time periods and those more distant from the river in longer periods. Wells above John Martin Reservoir have an average distance from the river of three-quarters of a mile. Those in excess of the average distance, if pumped during August and September, will have no appreciable effect upon the river during the same irrigation season. The State considered only irrigation season effects and assumed no zeroing out by winter irrigation practices or other intervening events (State Ex. I). It presented no evidence of (i) non-irrigation season needs by senior appropriators or (ii) non-irrigation season shortages as a consequence of well diversions. There is no evidence that a non-irrigation season impact of late summer pumping will cause material injury to any vested right. But the State contends that if wells are pumped at regular intervals each year, the effect over time levels out, in the absence of intervening events that "zero out" the depletive effects, so as to cause substantially equal depletions to the river in each month throughout the year (State Ex. H) that this plateau point should already be

reached with respect to most wells in the Arkansas Valley, and that the late summer pumping would have some effect upon available surface supplies in later years. It presented no competent evidence, however, to show that the effects are not in fact zeroed out by winter irrigation or that the river flows in subsequent years have in fact been reduced.

13. The size of depletive effects of well diversions on surface stream flows depends upon the percentage of the diverted water consumed (i.e., the consumptive use ratio), changes in evaporation and phreatophyte losses that result from water table changes, changes in groundwater storage and the extent of alluvium recharge that occurs during wet cycles or as a consequence of widespread winter irrigation practices. Although the latter factors do not negate the collected depletions to the river system, they may "zero out" the effects, so that senior appropriators do not lose their historical level of river diversions, are able to supplement such diversions by well water and have no need or right to "call" for the curtailment of wells.

14. The State assumed but introduced no competent evidence to prove a well consumptive use ratio of 75%. This figure was derived from a study of W. W. Wheeler and Associates and Woodward-Clyde & Associates in 1968 (State Ex. E herein called the "Wheeler Report") and from the computer fit employed by James O. Taylor of the United States Geological Survey in his hydrological study of the Arkansas River described in State Exhibit Q and Protestants' Exhibit 2 (herein called the "Taylor Study"). The Wheeler report had no documentation for the assumed consumptive use figure, but described it as a

figure derived from prior USGS studies, (State Ex. E-2 p.ii). The Exhibit was admitted, over objection, for general background data, not for the conclusions stated therein, unless the authors were brought to court for cross-examination and they were not. Taylor explained that his consumptive use figure was the consumptive use percentage of total applied water (including precipitation, ditch and well water) within and outside of the alluvial basin which best fit observed increases in groundwater storage (Protestant Ex. 2); and that he had assumed that 50% of the ditch water was applied outside of the basin and should be charged with a 100% consumptive use (Protestant Ex. 2). This assumption naturally enlarged the "computer fit" number beyond that which might be determined by field testing. Although witnesses for the State agreed that the consumptive use ratio could be determined empirically by field testing they acknowledged that no such testing had in fact been done. On the other hand, Dr. Morton Bittinger, hydrological witness for Protestants, through use of regression analyses developed for variables that could be measured, showed theoretical depletions to the stream during the irrigation season, absent other hydrological influences, to range from 18% to 27 % of total diverted well water (Protestants Exs. 21 and 22). Such analyses were confirmed by Taylor's computer projections of stream depletions in the same level of magnitude, (State Ex. Q). As such analyses and conclusions have not been negated by empirical testing or other competent evidence, the Court finds that, in absence of counteracting hydrological influences, wells in the Arkansas alluvium depleted the Arkansas River during the irrigation season no more than

18% to 27% of total diversions prior to curtailment under the 1973 Rules and, based on the State's evidence of average well diversions of 154,700 acre feet per year, the aggregate of all such depletions during the irrigation season did not exceed 27,500 to 41,300 acre feet per year. Whether actual depletions to the surface stream reached these calculated maximums, however, was never confirmed by the evidence.

15. Although witnesses for the State denied on the basis of personal opinion that the Arkansas was aggrading (i.e., raising its bed and consequent water table by sedimentation) during periods between scouring floods, empirical evidence in the exhibits of both parties shows the amount of water in transient storage in the Arkansas alluvium to have increased in recent years (State Exs. C, EE, Q; Protestant Exs. 10, 12). Such increases represent a loss of water to the surface stream and a loss of water to the stream system as a whole to the extent that the higher water table results in greater evaporation and transpiration losses. To the extent that well withdrawals avoid this loss, through lowering the water table, the quantitative effect of well diversions on surface flows is reduced. Dr. Bittinger attributed the increase in groundwater storage to irrigation of overlying lands and aggradation of the riverbed between periods of scouring flood (Protestant Ex. 12). The Taylor Study (State Ex. Q) predicted a long-range increase in groundwater storage, under the then existing regimen of well pumping, of 11,000 acre feet per year. Taylor also concluded that more groundwater could be withdrawn by wells in the basin without lowering the water table. The rising water table was corroborated by the testimony of Dr. Bittinger that phreatophyte growth is

encouraged by a rise in the water table and by studies published by him in 1963 showing that phreatophyte growth between La Junta and Las Animas had increased from 2,565 acres in 1963 to 3,557 acres in 1957 (Protestant Ex. 11) and by actual well measurements of the USGS and Colorado State University (State Exs. C, D; Protestant Exs. 12, 12A).

16. The depletive effect of well pumping upon observed and measured river flows is also offset by recharges of the aquifer from cyclical wet periods and from widespread winter irrigation practices. Winter irrigation (i.e., from November 1 through March 31) is practiced for the purpose of increasing germination moisture and conditioning the soil. There is little or no applied water consumptively used for plant growth during the non-irrigation season. Although a portion may be held in the root zone area, a substantial amount of the water applied recharges the groundwater aquifer and increases irrigation season return flows. Protestant's witness E. G. Kidder testified that winter irrigation results in a noticeable, rather rapid increase in the water table as observed in drainage ditches. During the 1926-1966 study period of the Wheeler report (State Ex. E-2, p. iv) average canal diversions during the non-irrigation season were 194,000 acre feet.

17. Notwithstanding theoretical hydrological analyses that support the State's contention that wells have depleted surface flows in the Arkansas River, the Court finds no competent evidence in the record that stream flows have suffered in fact during the post-well period or that reductions, if any, can be traced to well diversions rather than to increased irrigation efficiencies, increased

groundwater storage, phreatophyte and evaporation losses, stock ponds, municipal sewage lagoons and pot holes or changes in side channel inflows. None of the evidence of the State, presented through the two Deputy State Engineers, sought in any empirical way to demonstrate actual stream depletions. The mass diagrams of Canon City, Pueblo, Nepesta, La Junta, Las Animas and State line flows between 1940 and 1972 (State Exs. K-2 to K-7) have little, if any, probative weight. Scales used in the presentation of the data were altered from station to station to dramatize asserted downstream effects. The base slopes for comparison purposes were selected for differing base periods and point fits. The comparison periods were of short duration, a condition that Dr. Danielson later claimed to be statistically unreliable. Changes in slopes (purporting to show changes in stream flows) had no particular correlation with the rate of growth in well diversions during the late 1950's and 1960's. In fact the principal slope departure, claimed to show a reduction in stream flows, occurred in the early 1950's in the Pueblo and Nepesta areas before and above the occurrence of principal well activity (State Ex. K-3 and K-4), and did not increase quantitatively at downstream gauges or in after years. Mass diagram techniques used by the State demonstrate changes, not causes, and cannot quantify either. When the Nepesta gauge mass diagram was extended backwards to 1918 by Dr. Bittinger and changes in slopes therein were compared with changes in precipitation and changes in the volume of well diversions (Protestants Exs. 14, 25, 26), it became evident that the slopes on which the State witnesses relied were tied more closely to precipitation cycles than to increases in

the level of well diversions. The mass diagram analysis of the State only showed that the 1940's were above normal in precipitation and runoff, the 1950's were dry and the 1960's were relatively wet (State Ex. P-4 regarding available supply at Canon City). Dr. Danielson's mathematical equations were no more conclusive. They only calculated a theoretical river loss based upon selective imputs [sic]. They ignored numerous factors which Dr. Danielson could not quantify but which he assumed could have effects on river gain or loss that are comparable to wells, i.e., stock ponds, municipal sewage lagoons, irrigation efficiencies, evaporation and phreatophyte losses and pot holes. Dr. Danielson's failure to account in his analysis for substantial side channel inflows from the Purgatiore River and other ungauged tributaries was never satisfactorily explained (Protestants Ex. 4, 5), nor was any credible explanation given for the fact that the slopes of the State's mass diagrams (State Exs. K-2 through K-7) noticeably steepened (showing increases in river flows) during the late 1950's and 1960's when the rate of well diversions was rapidly increasing. On the other hand Protestants' mass diagram of river flows at Nepesta from 1918 through 1972 (Protestant Ex. 14) patently showed cyclical fluctuations through wet and dry periods but no demonstrable change in the overall slope of the mass diagram line (and no visible reduction in river flows) during the entire observation period.

18. The Court finds no competent evidence in the record that senior water rights have been materially injured in fact as a consequence of well diversions permitted by the 1973 Rules. The absence of such evidence would follow from and tend to confirm Finding 17 that

depletions in river flows have not been demonstrated. The tables prepared for State Ex. I stopped with 1972 and excluded from the mass diagram analyses all 1973 and 1974 river flow and diversion data that would show the effect of the 1973 Rules. Dr. Danielson admitted that no such investigations had in fact been made. The only evidence presented by the State in any way relating to its claim of material well-induced injuries to surface rights was (i) Exhibit P-2, as corrected for statistical errors by P-4, regarding available supply and surface diversions from 1940 to 1972 between Canon City and the State Line and (ii) mass diagrams of historic calendar year diversions of certain selected ditches (Excelsior, Rocky Ford Highline, Otero and Amity, State Exs. L-1 to L-8). When the fluctuations in available supply at Canon City and total diversions, as plotted on State Exhibit P-4, are compared, it is apparent that the reduction in diversions in the mid-1950's corresponded with a decrease in available supply at Canon City (i.e., a reduced runoff) and that the increased level of diversions in the late 1950's and early 1960's corresponded with an increase in such available supply. When Dr. Bittinger extended the mass diagram of diversions backward to 1927 (Protestant Ex. 15), it became further apparent that the diversion curve follows the same cyclical slope on the mass diagram as the slope of flows at the Nepesta gauge (Protestant Ex. 14) and the available supply at Canon City (State Ex. P-4). Dr. Danielson's selection and interpretation of data on individual ditches also had little probative value. By extending the mass diagrams back through 1927 (Protestant Exs. 16 to 19), Dr. Bittinger demonstrated that the fluctuations observed by Dr. Danielson in the early 1950's marked a

climatic cycle and that subsequent changes did not occur at times, in the amounts and in the manner that would parallel changes in rates of groundwater withdrawals. Moreover the changes in measured diversions for each of the selected ditches were readily explainable by known changes in available reservoir water supplies, changes in winter irrigation practices, changes in ditch operations and, in the case of the Amity Ditch, changes in winter storage in John Martin Reservoir subsequent to 1943. Protestants met the inconclusive evidence of the State with rather persuasive evidence that no significant reduction in ditch diversions have in fact occurred in the post-well period. The testimony of George Reyher, a director of the Fort Lyon Canal, showed that the Fort Lyon Company has an unfilled or partially filled decree in the river throughout most of each irrigation season; that river depletions, if any, should be visible by a steady reduction in the Fort Lyon diversions; and that the records of the company show cyclical changes in available supplies but no progressive decline in diversions during the period when well diversions were increasing. The records of the ditch company showed that average diversions during the 1930's were 1.93 acre feet per acre; during the 1940's were 2.44 acre feet per acre; during the dry 1950's were 2.12 acre feet per acre; during the 1960's (following the rapid increase in wells in the 1950's) were 2.35 acre feet per acre; and during the early 1970's were 2.43 acre feet per acre. During this period the irrigated acreage under the Fort Lyon Canal remained the same.

• • •

DECREE

WHEREFORE, IT IS ORDERED, ADJUDGED AND DECREED that the proposed Amendment to Rule 3 of the Rules and Regulations Governing the Use, Control and Protection of Surface and Groundwater Rights in the Arkansas River and Tributaries be disapproved and be of no force and effect and that the existing 1973 Rules and Regulations continue to be in effect except as provided herein;

• • •

Done this 1st day of December, 1976.

BY THE COURT:

/s/ William L. Gobin
WILLIAM L. GOBIN,
ACTING WATER JUDGE

• • •

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Appendix Item 3

Excerpts from Colorado Exhibit 1203
(pages 1-8 and Table 2)

A-29

An Evaluation of the Value of Water Estimates Contained in the Kansas Experts Report -

by

Richard M. Adams
Professor of Agricultural and Resource Economics
Oregon State University

[Pages 1-8]

Introduction

The value of water in alternative uses is a topic of long standing research and policy importance. In much of the arid western U.S., water supplies are insufficient to meet competing demands. Historically, water was allocated across competing uses via legal or institutional means, rather than by markets. In the absence of market price information from which to ascertain the use value of water, resource economists developed techniques to infer water values. This has lead to a rich literature on the value of water in a number of uses, including irrigated agriculture. These inferred values, in turn, have been used in policy debates concerning the efficiency of alternative water allocations.

The numerical estimates generated by economic assessments, including those involving water resources, can be affected by a variety of factors. These include the measurement techniques employed, the nature of the data and the types of assumptions made by the analyst. Thus, one would not expect two studies of the same issue to yield identical numerical estimates. However, no one expects central tendencies in the estimates as long as the

models and data accurately reflect the real world processes being studied. That is why it is important in evaluating the credibility of any empirical study to compare the results with those from similar studies. Such comparison is considered a standard procedure in scientific research and is expected in the peer review process used to select manuscripts for publication in scientific journals.

The extant literature on water use and values, with numerous site-specific studies of the value of water in the production of a range of crops, can be used in judging the plausibility of the damage estimates contained in the Kansas report. In this report, I compare the values for water implied by the Kansas experts with previous studies of similar crops. Based on this review and comparison, I conclude that the Kansas estimates for the value of water are three to four times higher than the consensus of water use values from previous studies. This calls into question the validity of the damage estimates claimed in Section C of the Kansas report. As discussed below, it is my judgement that the excessively high values for water implied by the Kansas experts arises from the crop yield production relationships employed in Section C of the Kansas report.

The Value of Water

Value in economics is tied to the concept of willingness to pay. For an individual, the value of an item is equal to what he/she is willing to pay for it in monetary terms or in terms of what they must give up to obtain that item; i.e., to obtain more of one good requires that the consumer give up a unit of some other good. This concept of

willingness to pay is also related to the notion of "demand" and the elicitation of demand curves. Specifically, a demand curve can be viewed as a marginal willingness to pay curve for the item (the term "marginal" refers to the value of the next or incremental unit demanded). This marginal willingness to pay declines with units consumed, hence for most goods the demand curve is downward sloping.

In agriculture, water is an input into the process of producing a crop. Water is not consumed because it provides any direct utility to the farmer but because it adds to the profits realized from the production of the crop. Thus, a farmer's demand for irrigation water is a derived demand. That is, the value (or willingness to pay) is derived from the demand for the product that the farmer is selling. Thus, the willingness of a wheat farmer to pay for a unit of water is affected by the price the farmer receives for his wheat. This is a fact that is well documented in the real world. For example, one sees increased pumping of ground water when crop prices rise and reduce pumping of ground water when prices fall, everything else being equal. Similarly, one sees farmers with surface irrigation supplies expending more on irrigation system improvements to enhance the productivity of their water during periods of high crop prices.

At given crop prices, it is possible to map a relationship between water demanded (used) in agricultural production and the price (cost) of obtaining the water. As with other demand curves, this curve is the marginal willingness to pay curve. This demand curve for an input such as water is also referred to as a Marginal Value Product curve, because it traces out the marginal value product of

water as the quantity used changes. In economic theory, it is generally assumed that an individual farmer's behavior will not affect the price of his output nor the cost of obtaining inputs, thus the main determinant of the marginal value product of water is the marginal productivity of that increment of water. The role of the marginal productivity of water in determining value (or willingness to pay) is important is this discussion of the Kansas estimates, which I will return to later.

Using these economic concepts, agricultural economists have estimated the demand for and value of water to agriculture. Based upon hypotheses suggested by the theory of demand, one expects that as more water is applied, the value of the water (or willingness to pay for it) declines. Also, the higher the crop value (price), the higher the willingness to pay for water. Thus, one expects that the value of water in the production of strawberries or tomatoes for the fresh market will exceed the value of water in the production of low value crops such as wheat or grain sorghum.

Table 1 reports estimates of the per acre foot values for water from a number of studies performed at several locations across the western U.S. (adopted from Gibbons). This table reports marginal values of water for specific crops. Since these studies were performed in different years (and hence would be affected by the crop price in a particular year) they are adjusted by the Index of Prices Received by farmers for that crop or crop group. As is evident from the table, the marginal value of water is higher for high valued crops than for low valued crops. For example, the range of values for wheat is from $8 to $50, for grain sorghum it is from $3 to $40 and for alfalfa

it is $10 to $42. Conversely, values in cotton range from $36 to $127, for sugar beets from $32 of $127 and for fresh vegetables the values are in excess of several hundred dollars per acre foot.

* * *

Comparison of Kansas Experts Estimates with Existing Studies

The evidence from the studies reported in Table 1 is that the marginal value of water to agriculture for the types of crops grown in the Garden City area of Kansas is in the range of $20 to $40 dollars per acre foot of applied water. One means to judge the validity of the Kansas damage estimates associated with stateline depletions to surface water flows is to compare the results implied by the Kansas analysis to the water values generated for similar crops in other settings. How then do the values in Table 1 compare with those implied by the Kansas experts?

The Kansas report does not specifically enumerate the marginal values for water. However, these values can be generated from the data and tables provided in Section C of the report. To make such a comparison, I calculate the value of water two ways. The first way is to use the column on "Crop Production Loss" reported in Table C8 of the Kansas report. This dollar value per year is divided by the headgate depletions (applied water) for that year reported in Table C2 of the Kansas report. This calculation leads to a lower bound estimate of the value of water implied by the Kansas report, because it does not include deficiency payments received for wheat and grain sorghum during some years of this time period. These values are then placed in constant dollars by adjusting

nominal values report in Table C8 by two indices, the Producer Prices Received Index (PRI) and the Consumers Price Index (CPI). By placing the values in constant dollars, estimates for one year, say 1950, can be compared with estimates in another year, such as 1994. The PRI is the more conservative of the two adjustment procedures, given that agricultural commodity prices tend to move both higher and lower over this time period, rather than the constant upward movement observed in the CPI. These values are reported in Table 2.

The second way I calculated the value per unit of water from Table C8 is to use the estimates of annual additional pretax profit ("Before Tax Total") reported by the Kansas experts, which includes the deficiency payments for wheat and grain sorghum. Since deficiency payments are a component of the value of the water in a given year, they should be accounted for in the calculation, via the yield averaging method used to calculate such payments. However, I did not have access to the spread sheets used by the Kansas experts to calculate deficiency payments in each year. Therefore, I used the estimates of annual before tax profit from Table C8 which includes stationary values for deficiency payments. As was the case with the use of the "Crop Production Loss" data, these estimates are then divided by applied water (stateline depletions) for each year to arrive at an annual value of water. These nominal values are then placed in constant dollars via the two adjustment procedures. The results of these calculations are reported in Table 3.

Tables 2 and 3 report the values for each year, in nominal dollars and in adjusted dollars, for the two calculation procedures. In both tables, the average of the 45 years for

each column of values is also reported at the bottom of the appropriate column. What one sees is that for the unadjusted (nominal) columns, the value per acre foot of water implied by the Kansas analysis is approximately $65 per acre foot without deficiency payments (Table 2) and $70 with such payments (Table 3). For the CPI adjusted columns, the value is $203 per acre foot without deficiency payments and $233 with the payments. Finally, for the PRI adjusted columns, the value is $109 per acre foot without the payments and $129 per acre foot with deficiency payments. Using the most conservative of these calculated values from Tables 2 and 3 of $109 per acre foot (the PRI adjusted value without deficiency payments) as a benchmark for the reasonableness of the Kansas estimates, one sees that this value is about four times the values found in the literature cited in Table 1 for these crops. Using the CPI adjustment, the Kansas estimates are almost eight times greater than the values for water found in the contemporary literature. Finally, if one were to take the value per acre foot implied by the compounded values reported in the last column of Table C8 from Section C of the Kansas report, the value is almost $700 per acre foot.

Why are the Kansas Estimates So Much Higher than Previous Studies?

The large differences in values per unit of water between published studies and those implied by the analysis in Section C of the Kansas report are important because they raise fundamental questions regarding the damages claimed by Kansas from crop production losses. One explanation for such differences is that there is some

unique combination of soils, climate, topography and agricultural management that makes water much more productive in this section of Kansas than in Texas, California, Arizona, the Pacific Northwest or virtually any other place in the western U.S. However, in my opinion, the high values for water implied by the Kansas report are not valid and are instead an artifact of the procedures used by Kansas in arriving at the damages reported in Section C.

The procedure used by the Kansas experts to estimate damages from the stateline depletions by Colorado is quite simple and differs from the "with and without" type of analysis one usually finds in such resource or project evaluations. The critical step in this calculation is the yield assumptions employed by Kansas. To calculate the value of water in the Kansas report, the authors assume a linear relationship between ET and crop yield. Specifically, the authors assume that an acre inch of ET translates into a yield gain of approximately 4.5 bushels of wheat, 9 bushels of sorghum and .15 tons of alfalfa (these coefficients are lower for earlier years and higher for more recent years). This linear relationship also imposes a constant marginal productivity for water. While a general linear relationship between ET and yield may be valid for some crops in experimental settings, it is important to understand that this is essentially a frontier concept. That is, to achieve (and more importantly, to sustain) this relationship, assumes that there are no other limiting inputs and that water applications are perfectly timed to meet water demand by the crop. In actual agricultural irrigation management, it is often difficult to time applications with that precision, particularly under

surface irrigation conditions. The constant marginal productivity assumption imposed by the Kansas experts also means that the last increment of water applied has the same productivity or contribution to profit as the first increment of water. This combination of a large and constant crop yield response to water leads to an unrealistically high value for the water. As Bernardo and Whittlesey note, in reference to the linearity assumption, "Determining crop yields in response to water supplies is in fact much more complicated, involving the timing of applications and availability, for example"

Summary

The high values claimed by Kansas for the stateline surface water depletions are inconsistent with the range of water values found in the literature for the typs [sic] of crops grown in this region. Besides the disagreement with other studies, these high implied values for water are also inconsistent with observed economic behavior within the study area. Specifically, one would expect that water of such high (and constant) marginal value would generate a range of behaviors on the part of farmers, including the conversion to wells throughout the study area. Indeed, one would expect every acre of farm land to be irrigated by wells, given that the value of water implied by the Kansas report is many times higher than the costs of pumping reported by the Kansas report.

Based on my approximately thirty years of academic research, teaching and editing experienced in the area of resource economics, it is my judgement that the damages claimed by Kansas in Section C are three to four times

higher than justified. This opinion is supported by comparison with previously published studies and by the economic behavior of the farmers actually engaged in agriculture in the region. This suggests that the damage claims for crop production losses arising from stateline surface water depletions should be reduced by two thirds to three fourths from the estimates reported in Section C of the Kansas report.

Table 2. Value of Water, per acre foot

Year	Crop Production Loss[1]	Depletions of Headgate Delivery (AF)[2]	Marginal/Average Value of Water **with no adjustment** (Nominal Dollars)	Marginal/Average Value of Water Using **Prices Received for All Crops** as an Adjuster (*1997* $)[3]	Marginal/Average Value of Water Using **CPI** as an Adjuster (*1998* $)[4]
1950	2,547	61	42	110	282
1951	17,891	362	49	115	309
1952	15,067	262	58	132	352
1953	45,153	621	73	186	442
1954	59,473	1,241	48	122	290
1955	101,510	2,512	40	108	245
1956	114,689	2,460	47	122	279
1957	38,834	1,028	38	103	218
1958	43,458	1,233	35	97	198
1959	8,640	256	34	93	188
1960	102,294	3,052	34	93	184
1961	77,601	2,132	36	99	198
1962	45,661	1,174	39	103	209
1963	80,979	2,149	38	97	200
1964	93,957	2,621	36	92	188
1965	86,591	2,669	32	87	167
1966	16,798	446	38	97	188
1967	11,430	358	32	87	155
1968	123,132	3,909	31	86	147
1969	46,793	1,437	33	92	144
1970	66,264	1,697	39	107	163
1971	74,076	1,763	42	107	169
1972	123,349	2,095	59	141	229
1973	123,261	1,185	104	162	380
1974	202,131	1,728	117	143	385
1975	247,855	2,482	100	135	301
1976	346,442	4,231	82	114	234
1977	228,746	3,195	72	101	192
1978	360,501	4,076	88	119	220
1979	375,229	3,817	98	120	220
1980	98,448	803	123	139	242
1981	126,173	1,219	104	109	185
1982	234,143	2,074	113	132	190
1983	39,500	348	114	125	185
1984	30,613	305	100	103	157
1985	-	-			
1986	48,886	980	50	66	74
1987	6,823	100	68	91	98
1988	60,723	609	100	110	137
1989	74,396	820	91	96	119
1990	119,256	1,614	74	82	92
1991	171,333	2,132	80	92	96
1992	167,943	2,233	75	86	87
1993	90,772	999	91	102	102
1994	133,678	1,551	86	94	94
Total		72,039			
Average of Marginal Values			65	109	203

[1] These values are taken from Table C8 of Kansas experts reports. Values *exclude* deficiency payment losses.

[2] These values are taken from Table C2 of Kansas experts reports.

[3] Index of prices received by farmers was obtained from the USDA National Agricultural Statistics Service, *Agricultural Statistics* (various years from 1964 to 1999). This index is from a table titled: Prices received by farmers: Index numbers by groups of commodities and parity ratio, United States. The index is an aggregate of all crops, and was converted to a base of 1997=100.

[4] The CPI was obtained from the Bureau of Labor Statistics home page: http://stats.bls.gov/top20.html. The CPI for All Urban Consumers with a base year of 1967=100 was converted to 1998=100.

Appendix Item 4

Excerpts from R.T. Vol. 200
December 21, 1999
(Direct Examination of Richard Adams)

[Pages 33 to 35, 43-44]

* * *

[33] Q. WHERE DID YOUR RESEARCH LEAD?

A. BECAUSE OF MY RESEARCH IN ENVIRONMENTAL ECONOMICS AND PUBLICATION THAT I – SEVERAL PUBLICATIONS THAT CAME OUT ABOUT THAT TIME, I WAS CONTACTED BY THE EPA AND ASKED IF I WOULD DIRECT A FAIRLY LARGE INTERDISCIPLINARY PROGRAM THAT THE EPA WAS CREATING AT THAT TIME TO DO A DAMAGE ASSESSMENT OF THE AIR POLLUTION ON CROPS IN THE UNITED STATES.

THE MOTIVATION FOR THIS IS THAT EPA IS REQUIRED BY CONGRESS TO ISSUE REGULATIONS TO CONTROL CERTAIN POLLUTANTS, WHICH ARE CALLED CRITERIA POLLUTANTS. ONE OF THOSE IS OZONE. AND EPA IS REQUIRED EVERY FIVE YEARS TO UPDATE THEIR STANDARD OR AT LEAST JUSTIFY THEIR STANDARD TO THE CLEAN AIR SCIENCE ADVISORY COMMITTEE AND OTHER OVERSIGHT BOARDS.

IN ORDER TO EXAMINE THIS ISSUE, EPA DECIDED THAT THEY NEEDED A FAIRLY LARGE STUDY OF THE EFFECTS OF AIR POLLUTION ON CROP DAMAGES IN – OR EXCUSE ME – THE EFFECTS OF AIR [34] POLLUTION ON CROPS, AND ALSO THEY WISHED TO HAVE AN ASSESSMENT DONE OF THE DAMAGES OR THE LOSSES DUE TO AIR POLLUTION.

Q. WHERE DID YOU CARRY OUT YOUR STUDY FOR EPA? AT THE UNIVERSITY OF WYOMING?

A. NO, I DID NOT. EPA HAS A LAB IN CORVALLIS. IT'S CALLED THE CORVALLIS ENVIRONMENTAL RESEARCH LABORATORY. THAT'S THE LABORATORY THAT DOES ECOLOGICAL RESEARCH OR, IN THIS CASE, PLANT SCIENCE RESEARCH FOR THE EPA. SO THEY SUGGESTED THAT I MOVE TO CORVALLIS TO DIRECT THIS PROJECT.

SO WE MOVED TO CORVALLIS, I BELIEVE, IN THE SUMMER OF 1981. I RETAINED MY EMPLOYMENT AT THE UNIVERSITY OF WYOMING. I WAS ON WHAT IS CALLED AN INTERGOVERNMENTAL PERSONNEL LAB APPOINTMENT, WHERE WYOMING WAS REIMBURSED FOR MY EXPENSES BY THE FEDERAL GOVERNMENT, AND I SPENT TWO YEARS IN CORVALLIS, HELPING TO ESTABLISH THIS PROGRAM WHICH WAS GIVEN THE NAME NATIONAL CROP LOSS ASSESSMENT NETWORK, OR NCLAN.

Q. DID YOU STAY IN CORVALLIS?

A. WE DID. AT THE END OF THE TWO-YEAR ASSIGNMENT, IT WAS CLEAR THAT THIS PROJECT WAS GOING TO GO ON FOR MANY MORE YEARS, AND ALSO AT THAT TIME THE DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS AT THE OREGON STATE UNIVERSITY HAD A POSITION OPEN FOR A WATER RESOURCE ECONOMIST OR SOMEONE WHO WOULD DO SOME WORK IN WATER [35] RESOURCES, AND I APPLIED FOR THAT POSITION AND WAS HIRED IN AUGUST OF 1983 AS AN ASSOCIATE PROFESSOR.

* * *

Q. DID YOU CONTINUE WORKING FOR EPA AT OREGON STATE?

A. EPA CONTINUED TO PROVIDE GRANT MONEY TO ME THROUGH OREGON STATE UNIVERSITY, AND I CONTINUED TO PROVIDE SOME GUIDANCE OR DIRECTION ON THEIR NCLAN PROGRAM, BUT, OF COURSE, I WAS NOW AN EMPLOYEE AT OREGON STATE UNIVERSITY, AND I HAD OTHER RESEARCH INTERESTS THAT I WAS ALSO PURSUING.

* * *

[43] Q. DO YOU WANT TO POINT OUT ANY OF YOUR MORE IMPORTANT CONSULTING PROJECTS IN YOUR RESUME?

A. CERTAINLY.

* * *

I HAVE WORKED FOR – ANOTHER ONE I WOULD POINT TO THAT I THINK IS RELEVANT TOO – THE REGULATORY PROCESS FOR OZONE IS THE CONSULTANCY [44] WITH BIOSPHERICS, INCORPORATED. THIS WAS ACTUALLY MONEY FROM THE ENVIRONMENTAL PROTECTION AGENCY. I HAVE BEEN – I WAS ASKED TO WRITE THE CHAPTER ON VEGETATION AND ECOSYSTEM DAMAGES IN THE OZONE CRITERIA DOCUMENT, AND I HAVE DONE THIS SUBSEQUENTLY. I BELIEVE I'VE WRITTEN THE LAST TWO – IN THE LAST TWO CRITERIA DOCUMENTS, I HAVE WRITTEN THE CHAPTERS ON VEGETATION DAMAGES.

THESE DOCUMENTS THEN GO THROUGH A VERY STRENUOUS REVIEW PROCESS BY INDUSTRY BECAUSE THE IMPLICATIONS OF THESE SORTS OF DOCUMENTS ARE QUITE PROFOUND FOR INDUSTRY. IF THE EPA RATCHETS DOWN THE REGULATION, THIS IMPOSES SOME FAIRLY HIGH COSTS IN INDUSTRY. SO IT'S A FAIRLY CONTENTIOUS PROCESS IN WHICH YOU HAVE TO - YOU KNOW, YOUR RESEARCH IS CRITIQUED BY PEOPLE WITH OPPOSING VIEWS. MY CHAPTERS HAVE SURVIVED THIS REVIEW PROCESS. AND I GUESS I WOULD ADD THAT BASED UPON OUR RESEARCH, EPA DID TIGHTEN THE SECONDARY STANDARD FOR OZONE FROM .12 PARTS PER MILLION TO, I BELIEVE, .10 PARTS PER MILLION.

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Appendix Item 5

Excerpts from R.T. Vol. 200
December 21, 1999
(Cross Examination of Richard Adams)

[Pages 121-22, 146-51]

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[121] Q. WHAT THAT MEANS IS THAT YOU HAVE QUANTIFIED HERE, IN GENERAL, VALUES THAT, AS A MATTER OF PRINCIPLE, ARE GOING TO BE LOWER THAN THE VALUES THAT ARE RELEVANT FOR THIS STUDY?

A. FIRST OF ALL, LET ME CORRECT SOMETHING. I HAVEN'T QUANTIFIED ANY OF THESE, MR. DRAPER. THESE ARE NOT MY STUDIES. I'M REPORTING THEM AS A SYNTHESIS. THIS IS A SYNTHESIS OF EXISTING LITERATURE. AND, SECONDLY, I CAN'T ANSWER THAT THEY'RE NECESSARILY GOING TO BE LOWER, BECAUSE I SAID THIS IS AN EMPIRICAL ISSUE.

AS WE KNOW, MOST OF THESE STUDIES THAT ARE REPORTED HERE ARE FROM WELLS. THESE ARE IN IRRIGATION CONDITIONS WHERE THEY HAVE A WELL. THE CONDRA, ET AL, STUDY, FOR EXAMPLE, HAS A WELL. THESE PEOPLE WOULD HAVE BETTER TIMING ON THEIR WATER. WATER WOULD PROBABLY BE MORE PRODUCTIVE.

SO IT'S DIFFICULT TO SAY THAT BECAUSE ONE IS SHORT RUN AND THIS SITUATION IN KANSAS IS SHORT-SHORT RUN DOES NOT NECESSARILY TRANSLATE INTO THE FACT THAT THESE VALUES ARE GOING TO BE HIGHER – OR EXCUSE ME – THAT THE VALUES IN KANSAS ARE GOING TO BE HIGHER THAN THESE SHORT-RUN VALUES.

THIS IS AN EMPIRICAL QUESTION THAT TURNS UPON A NUMBER OF FACTORS, INCLUDING THE

FACT THAT THESE STUDIES THAT I HAVE TAKEN FROM THE [122] LITERATURE TEND TO BE STUDIES IN WHICH FARMERS HAVE WELLS OR HAVE WATER THAT THEY CAN TIME IN SUCH A WAY AS TO MAXIMIZE THE POTENTIAL OF THE WATER.

Q. BUT YOU DID NOT INCLUDE ANY SHORT-SHORT-RUN CASES IN YOUR TABLE NO. 1; ISN'T THAT RIGHT?

A. THAT IS CORRECT, BECAUSE I COULD NOT FIND ANY. I HAVE ONE, AS I THINK I MENTIONED EARLIER, IN THE TEXTUAL MATERIAL IN MY REPORT THAT I THINK WOULD QUALIFY IN THAT SETTING. BUT THERE ARE VERY FEW STUDIES OF THE SHORT-SHORT-RUN TYPE IN THE LITERATURE.

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[146] Q. BUT IF YOU'RE LOOKING AT THE VALUE THAT FARMERS WOULD PAY FOR WATER, THAT WOULD RELATE TO THE VALUE THAT THEY ACTUALLY RECEIVE FROM THE USE OF THAT WATER FOR AGRICULTURAL PURPOSES, WHICH WOULD CORRESPOND TO THE AFTER-TAX VALUE; ISN'T THAT RIGHT?

A. AGAIN, WE'RE TRYING TO DEAL WITH COMPARING APPLES AND APPLES IN MY ANALYSIS, AND I THINK BY USING A BEFORE-TAX TOTAL, THAT THAT WAS AN APPROPRIATE COMPARISON TO THOSE WITHIN THE LITERATURE.

NOW, WE CAN TALK ABOUT WILLINGNESS TO PAY, AND I THINK THAT'S A VERY GOOD SUBJECT TO BRING UP. WHEN WE TALK ABOUT WILLINGNESS TO

BEST AVAILABLE COPY

PAY FOR WATER, ONE OF THE IMPORTANT ATTRIBUTES OF THAT WILLINGNESS TO PAY – FOR EXAMPLE, IF WE TALK ABOUT THE CALIFORNIA WATER MARKET, THE FARMERS SHOWING THE WILLINGNESS TO PAY FOR THE WATER – THAT WATER THAT THEY ARE PAYING FOR IS DELIVERED AS THEY NEED IT. THEY'RE GETTING A FIXED, FIRM SUPPLY WHEN THEY NEED IT SO THEY CAN APPLY IT AT A PERFECT TIME.

AND WE KNOW IN TERMS OF WILLINGNESS TO PAY FOR WATER, IF WE LOOK AT THE CALIFORNIA WATER MARKET, THAT FARMERS IN THE '92 AND '94 DROUGHT WERE PAYING $100 FOR WATER TO APPLY TO VERY HIGH-VALUE CROPS AND IN SOME CASES, AS WE NOTED IN THE EXHIBIT THAT YOU INTRODUCED [147] YESTERDAY, THAT IN THE BROADVIEW IRRIGATION DISTRICT, THAT FARMERS WOULD NOT PAY THE $175 AN ACRE FOOT, WHICH WAS THE CALIFORNIA WATER PRICE IN '75, EVEN TO IRRIGATE VERY HIGH-VALUE CROPS.

THE ONLY VALUE THAT WE HAVE IN THAT CASE SHOWS THAT THEY WERE BUYING PUMP WATER FROM AN ADJACENT DISTRICT AT $100 AN ACRE FOOT. THAT'S WATER THAT ARRIVES WITH PERFECT TIMING TO APPLY TO CROPS LIKE TOMATOES THAT HAVE A GROSS VALUE OF OVER $2,000 AN ACRE, TO APPLY TO COTTON WITH A GROSS VALUE OF OVER $1,000 AN ACRE, AND TO OTHER CROPS SUCH AS ALFALFA, WHICH HAS A YIELD OF 8 TO 10 TONS PER ACRE AS OPPOSED TO 4 IN YOUR AREA.

SO WE CAN SEE THAT THE WILLINGNESS TO PAY IS AFFECTED BY MANY FACTORS BESIDES JUST THE TAXES. AND, AGAIN, USING YOUR EXAMPLE FROM YESTERDAY, THE WILLINGNESS TO PAY AS DEFINED IN THE MARKETPLACE FOR WATER – AGAIN, ARRIVING AT A PERFECT TIME – IS LESS THAN THE VALUE THAT YOUR KANSAS EXPERT REPORT SAYS IS THE VALUE OF WATER ON LOW-VALUE CROPS WITH LOW YIELDS.

Q. YOU WERE HERE, WERE YOU NOT, WHEN WE AGREED – PROFESSOR WICHELNS AND I – THAT THE INTRASEASONAL VALUE THAT HE QUOTED THERE WAS IN THE $150 TO $160 RANGE?

A. I WENT BACK AND LOOKED AT HIS REPORT, SIR, AND IT TURNS OUT THAT WHEN PROFESSOR WICHELNS DID [148] HIS CONVERSION, HE DID IT BACKWARDS IN HIS PAPER. THE PRICE FOR WATER THAT WAS OFFERED IN 1991 THROUGH THE CALIFORNIA WATER BANK – THE BUY PRICE, BEING THE PRICE AT WHICH YOU COULD BUY IT, WAS $175 AN ACRE FOOT. THE SELL PRICE, IF YOU WERE TO SELL WATER TO THE BANK, WAS $125. THE DIFFERENCE WAS CARRIAGE WATER, WHICH WAS WATER THAT WAS NEEDED TO MEET THE STREAM FLOW CONDITIONS IN THE DELTA.

HE HAD 216 PER MEGALITER. A MEGALITER IS ACTUALLY LESS THAN AN ACRE FOOT. SO HE CONVERTED IT THE WRONG WAY. IT SHOULD HAVE BEEN ABOUT $150 FOR A MEGALITER. SO IF WE DO THE CONVERSION ON HIS NUMBERS IN HIS ARTICLE WHERE I BELIEVE HE HAD $123 PER MEGALITER

FOR ACTUAL PURCHASES FROM AN ADJACENT IRRIGATION DISTRICT AND DO THE RIGHT CONVERSION, IT'S $100 AN ACRE FOOT IS WHAT THEY WERE PAYING IN THE BROADVIEW DISTRICT FOR WATER TO IRRIGATE CROPS THAT HAVE A GROSS VALUE OF ABOUT TEN TIMES THE VALUE IN SOUTHWEST KANSAS.

Q. DID YOU FIND OTHER MISTAKES IN PROFESSOR WICHELNS' WORK?

A. NO, I DID NOT. THAT'S A COMMON PROBLEM WHEN AMERICAN ECONOMISTS HAVE TO CONVERT TO METRIC UNITS. I'VE DONE IT MYSELF.

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[149] SPECIAL MASTER: PROFESSOR ADAMS, DID YOU LOOK AT THE PRICES FOR THE DROUGHT WATER BANK IN CALIFORNIA FOR ANY OF THE EARLIER YEARS? MY RECOLLECTION IS THAT WATER WAS SOLD IN '76 – THERE WAS A VERY SEVERE DROUGHT IN CALIFORNIA IN '76. I MAY NOT BE REMEMBERING THIS RIGHT, BUT WATER WAS SOLD FROM THE DROUGHT WATER BANK MORE THAN JUST IN 1992, AND I JUST WONDERED IF YOU LOOKED AT ANY OF THE OTHER PRICES.

THE WITNESS: I DIDN'T. JUST PRIOR TO COMING DOWN HERE, YOUR HONOR, I DID ASK PROFESSOR HOWITT TO SEND ME SOME DOCUMENTS ON THE CALIFORNIA WATER BANK.

SPECIAL MASTER: THERE'S A REPORT THAT'S OUT ON THE CALIFORNIA WATER BANK THAT HAS ALL OF THE PRICES WHICH THE STATE PAID TO BUY

THE WATER. IT HAS THE CARRIAGE LOSSES WHICH PEOPLE HAD TO ABSORB -

THE WITNESS: THAT IS CORRECT.

SPECIAL MASTER: - AND THEN THE [150] PRICES WHICH PEOPLE PAID TO GET THE WATER.

THE WITNESS: THAT'S CORRECT, YOUR HONOR. I THINK IT'S BY MCJONES - OR JESSERICK.

SPECIAL MASTER: WELL, THERE'S AN OFFICIAL REPORT OUT BY THE DEPARTMENT OF WATER RESOURCES.

THE WITNESS: I THINK THAT MAY BE HIS. I THINK HE'S A DEPARTMENT OF WATER RESOURCES EMPLOYEE.

• • •

BUT IN ANSWER TO YOUR QUESTION, YOUR HONOR, I DID LOOK AT A RECENT PUBLICATION THAT REPORTED THE VALUES IN THE '91 WATER BANK, THE '92, AND THE '94. IN THE '91 WATER BANK - AND YOU'RE WELL AWARE OF HOW THE BANK OPERATES. BUT IT STATES A PRICE, A SELL PRICE AND A BUY PRICE. AND THE SELL PRICE, WHAT THE FARMERS RECEIVED BY SELLING WATER IN '91 WAS $125 AN ACRE FOOT. THE DEPARTMENT OF WATER RESOURCES WAS INUNDATED WITH WATER. FARMERS WERE VERY HAPPY TO SELL WATER TO THEM AT THAT PRICE.

IN '92 AND 94 THEY LOWERED THE VALUE. [151] THE WATER BANK SET A PRICE AT $100 - EXCUSE ME

- $76 TO SELL, AND TO BUY FROM FARMERS, IT WAS AT $50 AN ACRE FOOT.

BUT MY POINT, IN RESPONSE TO MR. DRAPER'S COMMENT ABOUT WILLINGNESS TO PAY FOR WATER, IS WE DO HAVE SOME REAL WORLD EVIDENCE ABOUT WILLINGNESS TO PAY FOR WATER. AND AS I SAID EARLIER IN MY COMMENTS, THIS IS ONE OF THOSE COMMON SENSE/ECONOMIC INTUITION VALUES THAT ONE COULD USE IN ASSIGNING VALUES IN THIS CASE.

IF FARMERS IN CALIFORNIA WERE ONLY WILLING TO PAY $100 IN THE MIDST OF A SEVERE DROUGHT IN '91 TO SAVE TOMATOES, COTTON, AND MELONS, WHICH, AS I SAY, HAVE VALUES OF UP TO TEN TIMES HIGHER THAN THE VALUE OF THE GROSS REVENUE OF WHEAT IN SOUTHWEST KANSAS, IT'S ONE OF THOSE PIECES OF EVIDENCE THAT I THINK SUGGESTS RATHER STRONGLY THAT A VALUE OF $109 AN ACRE FOOT IN KANSAS IS NOT REASONABLE.

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A-53

Appendix Item 6

Excerpts from R.T. Vol. 203
January 12, 2000
(Direct Examination of Norman Whittlesey)

[Pages 102-108, 114, 117-118]

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[102] MR. DRAPER: I WOULD ASK THAT WE NOW TAKE OUT PLAINTIFF'S EXHIBIT 1017, AND I WILL HAND YOU ONE, YOUR HONOR. THIS IS A NEW EXHIBIT. AND I THINK WHILE WE'RE GETTING OUT EXHIBITS, IT MIGHT BE GOOD TO GET OUT TWO OTHERS. THAT'S DEFENDANT'S EXHIBIT 1203 AND PLAINTIFF'S EXHIBIT 1070.

SPECIAL MASTER: TEN WHAT?

MR. DRAPER: SEVENTY.

Q. PROFESSOR, WHAT IS PLAINTIFF'S EXHIBIT 1017?

A. EXHIBIT 1017 IS A "REVIEW OF AN EVALUATION OF THE VALUE OF WATER ESTIMATES CONTAINED IN THE [103] KANSAS EXPERTS REPORT, EXPERT REPORT PREPARED FOR THE STATE OF COLORADO BY RICHARD M. ADAMS," AND THIS IS A REVIEW PREPARED BY NORMAN K. WHITTLESEY, OCTOBER 15, 1999.

Q. YOU ARE THE AUTHOR?

A. YES, SIR.

Q. NOW, THE EVALUATION BY RICHARD M. ADAMS, IS THAT DEFENDANT'S EXHIBIT 1203?

A. YES.

Q. AND IN PLAINTIFF'S EXHIBIT 1017, DID YOU MAKE AN ANALYSIS OF PROFESSOR ADAMS' WORK?

A. YES, I DID.

Q. HOW DID YOU GO ABOUT DOING THAT?

A. WELL, PROFESSOR ADAMS' APPROACH TO HIS REPORT WAS TO COLLECT VALUES OF WATER FROM PUBLISHED LITERATURE OVER SOME HISTORIC PERIODS AND FROM VARIOUS REGIONS OF THE WESTERN UNITED STATES.

Q. HE DID A LITERATURE REVIEW?

A. IN ESSENCE, THAT WAS HIS REPORT. IT WAS A LITERATURE REVIEW INTENDED TO COMPARE WATER VALUES FROM THE PUBLISHED LITERATURE WITH THOSE WHICH HE DEVELOPED FROM THE MEASURE OF KANSAS DAMAGES FOR CROP LOSS FROM THE KANSAS REPORT.

Q. NOW, IN THE CROSS-EXAMINATION OF PROFESSOR ADAMS, HE AND I DEVELOPED WHAT IS MARKED AS PLAINTIFF'S EXHIBIT 1070. DO YOU HAVE THAT?

A. YES, I DO.

Q. WHAT IS THE RELEVANCE OF PLAINTIFF'S [104] EXHIBIT 1070 TO THE ANALYSIS IN PROFESSOR ADAMS' REPORT?

A. IN A VERY ABSTRACT SENSE, WHAT IS SHOWN IN EXHIBIT 1070 IS AT LEAST THREE POSSIBLE MEASURES OF WATER VALUE THAT CAN BE DERIVED BASED ON, IN THIS CASE, THE DEFINITION OF TIME HORIZON, LONG RUN AND SHORT RUN AND WHAT'S CALLED A SHORT-SHORT RUN IN THIS

CASE AND WHAT I REFERRED TO IN MY REPORT AS AN INTRASEASONAL SITUATION.

IN GENERAL, THE DEFINITION OF "LONG RUN" IN ECONOMICS IS THAT ALL COSTS ARE VARIABLE. SO WE'RE STARTING FROM A POSITION IN WHICH THERE ARE NO INVESTMENTS AND MAKING OR COLLECTING INFORMATION OR MAKING AN ANALYSIS ABOUT A DECISION, IN THIS CASE, PERHAPS REGARDING WHETHER TO IRRIGATE OR DEVELOP IRRIGATION.

AND SO IN SUCH A SITUATION, IF ONE IS CONSIDERING THE POSSIBILITY OF DEVELOPING A NEW IRRIGATION PROJECT IN THE DESERT, LET'S SAY, WHERE THERE'S NO CROPLAND AND NOTHING THERE THAT WE CAN, SAY, DRILL WELLS AND START IRRIGATING, WE HAVE TO CONSIDER AS THE RETURNS TO THE WATER, OR THE NET VALUE OF THE WATER, NOT ONLY ALL OF THE COSTS OF PRODUCTION – THE USUAL VARIABLE COSTS OF FERTILIZER AND MACHINERY AND SEED AND SO ON – BUT ALL THE FIXED COSTS OF THE DEPRECIATION AND CAPITAL ASSOCIATED WITH MACHINERY AND IN ADDITION TO THE COST OF [105] OBTAINING THE WATER.

NOW, THERE'S A COUPLE OF WAYS ONE CAN DO THAT. BUT NEVERTHELESS, WHAT WE'RE TALKING ABOUT IN THE LONG RUN IS A VALUE OF WATER THAT IS NET OF TOTAL COSTS, FIXED AND VARIABLE COSTS. AND BECAUSE WE ARE ACCOUNTING

FOR WHAT SHOULD BE ALL COSTS IN THAT SETTING, WE WOULD EXPECT THE VALUE OF WATER TO BE LOWEST OF THOSE POSSIBILITIES THAT EXIST.

THE NEXT AND WHAT I CALL SHORT RUN AND WHAT IS LABELED AS SHORT RUN IN THIS CASE IS NORMALLY THAT WHICH IS OBSERVED IN THE LITERATURE AS DEVELOPED BY AN ECONOMIST WITH BUDGET STUDIES OR LINEAR PROGRAMMING OR NONLINEAR PROGRAMMING IN WHICH THE VARIABLE COSTS OF PRODUCTION OF CROPS ARE PART OF THE ANALYSIS AND HENCE BECOME SUBTRACTED FROM THE GROSS VALUE OF WATER FOR CROP PRODUCTION. AND IN THAT SENSE, WE GET WHAT IS LABELED AS A MIDDLE VALUE OF WATER OR SOMETHING THAT WOULD BE BETWEEN THE LOWEST AND THE HIGHEST.

THE SHORT-SHORT RUN, OR WHAT MIGHT BE VIEWED AND WHAT I TERM THE INTRASEASONAL SETTING, IS THAT OF – LET ME BACK UP AND SAY ONE MORE THING ABOUT THE SHORT RUN JUST SO IT'S CLEAR. AND THAT IS THAT IN GENERAL WHAT THAT IMPLIES IS THAT THE QUANTITY OF THE WATER AVAILABLE TO THE FARM IS KNOWN AT THE BEGINNING [106] OF THE SEASON SO THAT ALL DECISIONS ABOUT INPUT COSTS ARE ABSOLUTELY KNOWN AND THAT ONE CAN THEN OPTIMIZE, IN ECONOMIST'S TERMS, THE USE OF THAT WATER IN DERIVING THE HIGHEST POSSIBLE VALUE IN CROP PRODUCTION.

AND THE SHORT-SHORT RUN, OR THE INTRASEASONAL CASE, WE ARE TALKING ABOUT THE

CONDITIONS THAT EXISTED IN WESTERN KANSAS IN THE DITCH SERVICE AREA WHERE CROPS WERE ESTABLISHED, CROPS WHICH WERE DROUGHT TOLERANT IN LARGE PART – WHEAT, SORGHUM, AND ALFALFA – BUT WOULD ALWAYS RESPOND TO WATER. AND WE'RE DESCRIBING THE INCREMENT OF YIELD THAT WOULD HAVE BEEN ACHIEVED IF THE WATER WERE APPLIED TO THESE GROWING CROPS.

SO WE ARE NOT CONCERNED ABOUT THE EFFECTS OF THE VARIABLE OR THE FIXED COSTS BECAUSE THE CROP IS ALREADY THERE. THE ONLY MARGINAL COSTS THAT BECOME RELEVANT AT THIS POINT ARE THOSE ASSOCIATED WITH THE APPLICATION OF THE ADDITIONAL WATER, OR THE IRRIGATION COST, AND THE ACCOUNTING FOR THE HARVEST OF THE ADDITIONAL CROP. SO IN THIS CASE, WE ARE GOING TO SUBTRACT FROM GROSS REVENUE ONLY THE MARGINAL COSTS ASSOCIATED WITH THAT INCREMENT OF WATER AND PRODUCTION. AND IN THIS CASE, WE WOULD GET THE HIGHEST VALUE OF WATER IN THE RANGE OF THE THREE THAT WE DESCRIBED HERE.

[107] Q. IN MAKING COMPARISONS WITH REGARD TO WATER VALUES, IS IT IMPORTANT TO KNOW WHICH TIME HORIZON YOU'RE DEALING WITH IN EACH CASE?

A. YES, IT IS. AND IT WOULDN'T, FOR EXAMPLE, BE APPROPRIATE TO USE A LITERATURE VALUE FOR A SHORT-RUN OR A LONG-RUN CONDITION OR SET OF ASSUMPTIONS AND THEN SAY THAT THAT

COMPARES TO THE INTRASEASONAL VALUE THAT WE ARE ASSESSING IN THIS CASE.

THE INTRASEASONAL VALUE IS NOT UNLIKE – I BELIEVE I HEARD THE LANGUAGE IN THE COURT HERE AT SOME POINT IN REVIEW OF SOME ARTICLE ABOUT WATER VALUE IN CALIFORNIA THAT WAS NEEDED TO FINISH THE CROP, AND IT HAD A VERY HIGH VALUE. I DON'T REMEMBER WHICH IRRIGATION WE WERE TALKING ABOUT OR WHO WAS TALKING ABOUT IT. BUT THAT'S THE NATURE OF WHAT WE'RE TALKING ABOUT HERE IS GETTING MORE OUT OF THE EXISTING CROP.

Q. DID YOU ANALYZE PROFESSOR ADAMS' REPORT, DEFENDANT'S EXHIBIT 1203, TO DETERMINE WHETHER ANY OF THE VALUES THAT HE REPORTED THERE WERE COMPARABLE TO THE INTRASEASONAL VALUES THAT WE ARE DEALING WITH IN THIS CASE?

A. YES, I DID.

Q. LET ME ASK YOU TO TURN TO TABLE 1 IN DEFENDANT'S EXHIBIT 1203. THAT'S JUST AFTER PAGE 9.

SPECIAL MASTER: TABLE 3?

MR. DRAPER: TABLE 1.

[108] Q. DOES THIS TABLE SHOW SOME OF THE SOURCES THAT PROFESSOR ADAMS COLLECTED?

A. YES, IT DOES.

Q. DID YOU DETERMINE WHETHER ANY OF THE SOURCES CITED FOR THE WATER VALUES ASSOCIATED WITH WHEAT, GRAIN SORGHUM, OR ALFALFA – DID YOU DETERMINE WHETHER ANY OF THOSE WERE COMPARABLE TO THE INTRASEASONAL TIME HORIZON THAT WE'RE DEALING WITH IN THIS CASE?

A. YES. I DID REVIEW ALL OF THE LITERATURE THAT IS REPRESENTED BY THE CROPS AND THEIR RESPECTIVE VALUES IN THAT TABLE. AND IN ALL CASES BUT ONE, THE VALUES WERE REPRESENTATIVE OF WHAT I WOULD DESCRIBE AS SHORT RUN WITH ONLY ONE – AND THEN A – ACTUALLY, LET'S SEE. LET ME BE SURE I DON'T MISSPEAK. YEAH, THAT'S TRUE. AND THEN THE ONE VALUE – THERE'S ONE SET OF VALUES OR ONE REFERENCE FROM WASHINGTON STATE UNIVERSITY THAT RELATED TO AN IRRIGATION DEVELOPMENT PROJECT IN SOME NONIRRIGATED PARTS OF THE STATE THAT WOULD HAVE TO BE DESCRIBED AS A LONG-RUN VALUE.

SO IN SUMMARY, ALL OF THE VALUES IN THE TOP HALF OF THIS TABLE RELATING TO WHEAT AND SORGHUM AND ALFALFA ARE OF A NATURE WHICH WOULD NOT BE DIRECTLY COMPARABLE TO THOSE BEING DETERMINED OR THE TYPE OF ANALYSIS BEING CARRIED OUT IN THE KANSAS CASE.

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[114] Q. BEFORE WE LEAVE THE ADAMS REPORT, DO YOU HAVE ANY OTHER CONCERNS WITH REGARD TO THE ANALYSIS IN THAT REPORT?

A. YES, SIR, I DO. I GUESS WHAT I WOULD SUGGEST IS THAT WE TURN TO TABLE 2, WHICH IS THE NEXT TABLE IN THAT REPORT.

Q. IS THAT THE SECOND TO THE LAST PAGE OF DEFENDANT'S EXHIBIT 1203?

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[117] SPECIAL MASTER: WHAT ABOUT THE FIRST FOUR COLUMNS OF THAT TABLE 2 WHERE HE TAKES THE PRODUCTION LOSS AND DIVIDES IT BY THE DEPLETIONS AND COMES UP WITH A MARGINAL VALUE OF THE WATER NOT ADJUSTED? IS THAT A PROPER [118] METHODOLOGY, DO YOU THINK, OF DETERMINING THE VALUE OF WATER, LET'S SAY, FOR 1950 AT $42 AN ACRE FOOT? FORGET THE ADJUSTMENTS FOR A SECOND.

THE WITNESS: YEAH, IN – YES. I WOULD NOT DISAGREE WITH THAT APPROACH. WHAT WE'RE SAYING IS THAT THERE WAS $2,547 OF CROP VALUE CREATED WITH 61 ACRE FEET OF WATER AND THE AVERAGE OF THAT – AND SINCE WE'RE DEALING WITH A LINEAR RESPONSE FUNCTION, IT IS ALSO A MARGINAL VALUE – IS APPROPRIATE. BUT WE MUST REMEMBER THAT IT IS AN INTRASEASONAL VALUE. IT IS NOT A SHORT RUN THAT'S NET OF PRODUCTION COSTS OR A LONG-RUN VALUE THAT'S NET OF WELL DEVELOPMENT COSTS OR SOMETHING OF THAT SORT. IT IS THE INTRASEASONAL VALUE FOR THAT YEAR.

SPECIAL MASTER: OKAY. I UNDERSTAND THAT.

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Appendix Item 7

Excerpts from R.T. Vol. 204
January 13, 2000
(Cross Examination of Norman Whittlesey)

[Pages 122-24]

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[122] Q. OKAY. THANK YOU. LET'S TURN TO TABLE A14 OF KANSAS EXHIBIT 1001. THIS TABLE SHOWS THE PUMPING COSTS FOR DEEP NATURAL GAS WELLS IN THE AMAZON SERVICE AREA; IS THAT RIGHT?

A. THAT'S CORRECT.

Q. NOW, IF YOU WOULD JUST FLIP BACK FOR A MOMENT TO TABLE A6, IT IS CORRECT, IS IT NOT, THAT THE AMAZON CANAL WELLS – THE WELLS IN THE AMAZON CANAL SERVICE AREA – HAD THE GREATEST HISTORIC PUMPING LIFTS IN THE 1950S OF ANY OF THE DITCHES IN KANSAS; IS THAT CORRECT?

A. APPARENTLY THAT'S TRUE, YES, IN THE '50S AT LEAST, YES.

Q. SO IF WE WANT TO LOOK AT COSTS IN 1950, THE AMAZON DITCH IS A GOOD EXAMPLE TO CHOOSE FOR DEEP NATURAL GAS WELLS BECAUSE NATURAL GAS WELLS IN THE AMAZON DITCH SERVICE AREA WILL HAVE THE HIGHEST PUMPING COST PER HOUR IN 1950 – IS THAT RIGHT? – BEING THE DEEPEST, HAVING THE MOST LIFT?

A. WELL, THEY'D BE VERY CLOSE TO THOSE OF THE GREAT EASTERN AND THE FARMERS DITCH, BUT THEY MIGHT BE SLIGHTLY HIGHER ON AVERAGE. I DON'T KNOW.

[123] Q. WELL, WOULD YOU AGREE THAT THEY HAVE THE MOST LIFT AND THEREFORE UNDOUBTEDLY WOULD HAVE THE MOST COST TO LIFT WATER?

A. IF YOU'RE TALKING SPECIFICALLY ABOUT 1950, YES.

Q. YES. YES, I'M TALKING ABOUT 1950.

A. OKAY.

Q. LET'S FOCUS ON THAT.

A. OKAY.

Q. OKAY. NOW, IF WE LOOK AT TABLE A14 IN EXHIBIT 1001 AND IF WE LOOK AT TABLE A14 IN EXHIBIT 892, IT APPEARS TO ME THAT IN 1950, THE COST TO PUMP AN ACRE FOOT OF WATER IN THE AMAZON DITCH WAS $3.77 IN YOUR ORIGINAL REPORT; IS THAT CORRECT?

A. YES.

Q. AND WHAT WAS THE COST IN YOUR REVISED TABLE A14?

A. IT'S SHOWN TO BE $2.28.

Q. OKAY. I HAVE HERE – AND I'M NOT GOING TO ASK YOU TO GET IT OUT, TO AVOID MORE PAPER SHUFFLES, BUT IN COLORADO TABLE CO-A14 IN PROFESSOR WICHELNS' REPORT, EXHIBIT 1096, WE HAVE A COST PER ACRE FOOT FOR THE AMAZON DITCH EXAMPLE OF $1.27. SO $1.27 NOW COMPARES TO YOUR VALUE OF $2.28.

A. OKAY.

Q. NOW, CERTAINLY $2.28 IS CLOSER TO $1.27 THAN $3.77, WHICH WAS YOUR ORIGINAL AMOUNT. I THINK WE COULD AGREE UPON THAT. IS THAT FAIR?

[124] A. YES.

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A-66

Appendix Item 8

Excerpts from R.T. Vol. 205
January 14, 2000
(Cross Examination of Norman Whittlesey)

[Pages 111-113]

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[111] Q. YOU TESTIFIED ON WEDNESDAY THAT NONE OF THE VALUES SHOWN ON TABLE 1 OF PROFESSOR ADAMS' REPORT WERE COMPARABLE TO THE VALUES THAT ARE IMPLIED IN YOUR ANALYSIS BECAUSE WITH ONE EXCEPTION THEY ARE ALL SHORT-RUN VALUES; IS THAT RIGHT?

A. YOU'RE REFERRING TO HIS TABLE 1?

Q. YES. MY RECOLLECTION, PROFESSOR, WAS THAT YOU SAID THEY ALL APPEARED TO BE SHORT-RUN VALUES [112] EXCEPT FOR ONE STUDY THAT YOU FELT WAS A LONG-RUN VALUE.

A. I BELIEVE THAT'S TRUE IN REGARDS TO THE CROPS THAT –

Q. OF INTEREST?

A. – WE'RE CONCERNED ABOUT. I DIDN'T INVESTIGATE THE VEGETABLE CROPS AND OTHERS.

Q. THAT WAS MY RECOLLECTION, THAT YOU LIMITED IT TO THE THREE CROPS OF INTEREST HERE.

A. YES.

Q. DO YOU HAVE AN EXAMPLE OF A STUDY THAT HAS CALCULATED VALUES OF WATER THAT ARE COMPARABLE TO THE KANSAS VALUES OF WATER? SINCE YOU CRITICIZED THE VALUES PROFESSOR ADAMS CHOSE, ARE YOU AWARE OF A STUDY THAT WOULD PRODUCE VALUES THAT ARE

COMPARABLE TO THOSE WHICH YOU PURPORT TO GENERATE IN THE KANSAS ANALYSIS?

A. WELL, THE CONTEXT OF SUCH VALUES WOULD BE REPRESENTED BY – AND I DON'T HAVE THE EXHIBITS IN FRONT OF ME, BUT I RECALL – AND PERHAPS IT WAS DURING PROFESSOR WICHELINS' TESTIMONY – THAT THERE WERE VALUES DESCRIBED TO, SAY, FINISH A CROP, WHICH WOULD BE, IN MY INTERPRETATION, TO BE ADDED TO GROWING CROPS. AND IN THAT CASE, THAT WOULD BE AN EXAMPLE OF WHAT I'M DESCRIBING.

Q. THAT WAS, I THINK, THE WICHELNS AND CONE PAPER – C-O-N-E – AND THAT INVOLVED THE IRRIGATION DISTRICT IN THE SAN JOAQUIN VALLEY?

[113] A. THAT'S THE ONE I RECALL, I BELIEVE.

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Appendix Item 9

Excerpts from R.T. Vol. 208
January 20, 2000
(Direct Examination of Richard Adams)

[Pages 49-51, 59-63, 67-70]

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[49] Q. DO YOU HAVE A COPY OF KANSAS EXHIBIT 1001?

A. I DO.

Q. THAT IS THE SUPPLEMENT TO THE KANSAS EXPERT REPORTS TESTIFIED TO BY PROFESSOR WHITTLESEY; IS THAT CORRECT?

A. THAT IS CORRECT. IT'S AUTHORED BY PROFESSOR WHITTLESEY AND DAVID B. WILLIS, DATED OCTOBER 15, 1999.

Q. OKAY. COULD YOU LOOK AT TABLE A14 OF THAT EXHIBIT, PLEASE.

A. YES, SIR.

Q. THESE ARE THE REVISED COSTS TO PUMP FROM A DEEP NATURAL GAS WELL IN THE KANSAS ANALYSIS; IS THAT RIGHT?

A. THAT IS MY UNDERSTANDING, THAT THESE WERE REVISED SUBSEQUENT TO THE TIME THAT I WROTE MY ORIGINAL REPORT THAT WE'VE BEEN DISCUSSING THIS MORNING AND IN MY EARLIER TESTIMONY.

Q. YOU COMPARED THE COSTS TO PUMP AN ACRE FOOT OF WATER FROM THE ORIGINAL TABLE A14 TO THE VALUES IN YOUR TABLE 2. IS THAT HOW YOU DID YOUR ORIGINAL ANALYSIS?

[50] A. AS I STATED, I USED TWO LINES OF INQUIRY, AND ONE WAS USING VALUES IN THE LITERATURE. THE SECOND WAS THE COMPARISON

BASED UPON COMMON SENSE OR ECONOMIC INTUITION. AND IF I RECALL IN MY TESTIMONY LAST MONTH, I STATED THAT I NOTICED IN THE KANSAS REPORTS THAT THE COST OF PUMPING AN ACRE FOOT OF WATER IN THIS AREA IN 1950 WAS APPROXIMATELY $3.77, AND THE NOMINAL VALUE OF THAT WATER AS IMPLIED BY THE KANSAS ANALYSIS WAS SOMETHING IN EXCESS OF $42 PER ACRE FOOT.

BASED UPON THAT COMPARISON, I BELIEVE I TESTIFIED THAT IT STRUCK ME AS EXTREMELY ODD THAT THE FARMERS WOULD NOT HAVE DRILLED WELLS GIVEN THAT DIFFERENTIAL BETWEEN POTENTIAL PROFIT AND THE COST OF PUMPING WATER. I NOW SEE THAT THIS COST OF PUMPING HAS BEEN REDUCED TO ABOUT HALF OF THAT, OR NOT QUITE HALF, SAY 60 PERCENT OF THAT INITIAL 3.77. IT'S NOT [SIC] REPORTED AS 2.88 PER ACRE FOOT.

Q. YOU MEAN 2.28?

A. OR 2.28. I'M SORRY. 2.28 PER ACRE FOOT.

SPECIAL MASTER: FOR 1950?

THE WITNESS: FOR 1950. SO THE VALUE OF WATER REMAINS AT 42. THE COST OF PUMPING AN ACRE FOOT OF WATER HAS FALLEN, ACCORDING TO KANSAS' ANALYSIS, TO $2.28, AND THAT, I BELIEVE, BUTTRESSES OR REINFORCES MY EARLIER OPINION ABOUT THE INCENTIVE THAT FARMERS [51] WOULD HAVE HAD TO HAVE DRILLED A WELL, GIVEN THAT WATER WAS AVAILABLE UNDER THEIR LANDS AND GIVEN THAT INSTITUTIONALLY THERE

WERE NO RESTRICTIONS ON WELL DRILLING, I BELIEVE, UNTIL 1978.

* * *

[59] Q. COULD YOU LOOK AT TABLE 1 OF YOUR REPORT, PLEASE, WHICH IS DEFENDANT'S EXHIBIT 1203.

A. YES, SIR.

Q. PROFESSOR WHITTLESEY SAID THAT THE PUBLISHED VALUES OF WATER IN THE ECONOMICS LITERATURE WERE WITH ONE EXCEPTION ALL SHORT-RUN VALUES OF WATER AND WERE NOT COMPARABLE TO THE VALUES OF WATER ESTIMATED BY THE KANSAS ANALYSIS. AND WHEN I REFER TO "PUBLISHED VALUES," I REFER TO THOSE SHOWN ON TABLE 1 AND DESCRIBED IN THE BODY OF YOUR REPORT.

DO YOU AGREE WITH PROFESSOR WHITTLESEY?

A. I AGREE. AND I BELIEVE I STATED THIS IN MY CROSS TO MR. DRAPER THE LAST TIME I TESTIFIED, THAT I WOULD CHARACTERIZE ALL OF THESE EXCEPT FOR ONE AS SHORT-RUN VALUES.

Q. DO YOU BELIEVE THAT – WELL, PROFESSOR WHITTLESEY WAS ASKED IF HE COULD CITE TO AN [60] EXAMPLE OF AN INTRASEASONAL VALUE OF WATER COMPARABLE TO THE VALUES OF WATER IN THE KANSAS ANALYSIS, AND HE CITED TO THE VALUES OF WATER IN THE WICHELNS AND CONE PAPER AS AN EXAMPLE OF INTRASEASONAL VALUES.

DO YOU AGREE THAT THE VALUES IN THE WICHELNS AND CONE PAPER ARE INTRASEASONAL VALUES?

A. I BELIEVE THEY ARE –

SPECIAL MASTER: WHICH PAPER IS THAT?

MR. ROBBINS: I'LL GET THAT FOR YOU. 1066, YOUR HONOR. THE WICHELNS AND CONE PAPER, WHICH IS PLAINTIFF'S EXHIBIT 1066.

SPECIAL MASTER: IT'S PLAINTIFF'S?

MR. ROBBINS: PLAINTIFF'S, YES, SIR. IT WAS INTRODUCED BY MR. DRAPER IN CROSS-EXAMINATION OF PROFESSOR WICHELNS.

SPECIAL MASTER: ALL RIGHT.

BY MR. ROBBINS:

Q. AS I RECALL, HE REFERRED TO THE TERN "FINISHING" WATER OR SOMETHING OF THAT SORT. DO YOU AGREE THAT THE VALUES IN THIS PAPER ARE INTRASEASONAL VALUES?

A. THE WAY PROFESSOR WHITTLESEY HAS DEFINED IT, THEY ARE COMPARABLE IN THE SENSE THAT THESE ARE VALUES OF WATER THAT WOULD BE AVAILABLE TO FINISH A CROP.

[61] Q. THEY WOULD BE SIMILAR TO THE MARGINAL VALUES THAT HAVE BEEN DISCUSSED IN THIS CASE?

A. THEY WOULD BE SIMILAR. I WOULD INTERPRET THEM AS MARGINAL VALUES. AND, AGAIN, I

THINK THEY FALL IN THE GENERAL DESCRIPTION OR DEFINITION THAT PROFESSOR WHITTLESEY IS USING.

Q. IF THE VALUES OF WATER CITED IN THE EXHIBIT 1066 ARE, IN FACT, INTRASEASONAL VALUES OF WATER, DO YOU DRAW ANY CONCLUSION FROM THE COMPARISON OF THOSE VALUES AND THE VALUES DERIVED IN THE KANSAS ANALYSIS?

A. I FIND THIS PAPER TO ACTUALLY BE QUITE USEFUL IN THAT SECOND LINE OF INQUIRY THAT I'M APPLYING HERE, AND THAT IS THE ONE I'VE LABELED "ECONOMIC INTUITION" OR "COMMON SENSE" OR A "REAL-WORLD TEST."

THAT PAPER BY PROFESSOR WICHELNS AND HIS COAUTHOR, MR. CONE, IS A PAPER THAT LOOKS AT THE BEHAVIOR OF FARMERS IN AN IRRIGATION DISTRICT IN THE SAN JOAQUIN VALLEY DURING THE 1992 DROUGHT. AND, AGAIN, AS I STATED IN MY – I BELIEVE IN CROSS-EXAMINATION THE LAST TIME I WAS ON THE STAND, THE VALUES IN HERE ARE INSTRUCTIVE, IN THIS CASE, BECAUSE WHAT THEY SHOW IS THAT IN 1992, FARMERS IN THIS DISTRICT HAD AN OPTION. THEY WERE SHORT OF WATER. THEY NEEDED WATER TO FINISH THE CROPS.

THEY HAD AN OPTION TO BUY WATER FROM THE [62] CALIFORNIA WATER BANK OR TO BUY WELL WATER FROM A NEIGHBORING DISTRICT. CALIFORNIA WATER BANK WATER WAS AVAILABLE AT $175 AN ACRE FOOT. THEY ELECTED NOT TO BUY

THAT. INSTEAD, THEY PURCHASED WATER FOR $100 AN ACRE FOOT FROM AN ADJACENT DISTRICT.

THE IMPLICATION I DRAW FROM THAT IS THAT FARMERS IN THIS AREA, WHICH, AGAIN, IS AN AREA THAT, AS WE DISCUSSED LAST TIME, HAS HIGH-VALUED CROPS IN THE CROP MIX, INCLUDING TOMATOES, MELONS, COTTON, AND THOSE THREE CROPS HAVE GROSS VALUES IN EXCESS OF $1,000 AN ACRE. THE FARMERS WERE WILLING TO PAY $100 TO BUY WATER. THEY WERE NOT WILLING TO PAY $175.

SPECIAL MASTER: WELL, IS THAT ACCURATE? THEY DIDN'T PAY $175 BECAUSE THEY COULD GET IT FOR $100. THAT'S NOT SURPRISING, IS IT?

THE WITNESS: WELL, CERTAINLY NOT, BUT THEY BOUGHT A CERTAIN AMOUNT OF WATER AT $100 AN ACRE FOOT. I DON'T KNOW AT WHAT POINT THEY STOPPED BUYING WATER, BUT I THINK THE $100 WOULD BE A LOWER BOUND IN THIS CASE.

THE POINT IS, AGAIN, THAT THE VALUE OF THE WATER TO THESE FARMERS IS SOMETHING BETWEEN $100 AND $175 IN THIS PARTICULAR SETTING FOR THE VERY HIGH-VALUED CROPS. AND COMPARING THAT TO THE VALUES REPORTED IN THE KANSAS EXPERT REPORT, [63] THEIR VALUE AVERAGED OVER THAT 50-YEAR PERIOD OR 45-YEAR PERIOD WAS ABOUT $109.

SO I BELIEVE THAT SOME OF THESE VALUES THAT WE FIND IN THE REAL WORLD AND IN THIS

CASE IN THE EXAMPLE OF THE CALIFORNIA WATER BANK WOULD SUGGEST THAT IT'S UNLIKELY THAT FARMERS WOULD BE WILLING TO PAY THE SAME AMOUNT OF MONEY IN KANSAS ON CROPS THAT HAVE A GROSS VALUE THAT IS APPROXIMATELY 10 TO 20 PERCENT OF THE GROSS VALUE OF SOME OF THESE OTHER CROPS THAT FARMERS IN CALIFORNIA WERE GROWING.

BUT I WOULD ALSO POINT OUT THIS WATER THAT THESE FARMERS WERE BUYING IS WATER THAT WAS AVAILABLE ON DEMAND, SINCE IT WAS WELL WATER, AND THAT WOULD TEND TO MAKE IT MORE VALUABLE THAN SURFACE WATER BECAUSE IT WAS BEING MADE UP THROUGH DEPLETIONS TO SURFACE-WATER-ONLY LANDS WHICH WOULD NOT ARRIVE IN A NECESSARILY TIMELY FASHION. SO YOU WOULD EXPECT THIS WATER TO BE SOMEWHAT MORE VALUABLE SIMPLY – IF ONLY BECAUSE IT'S AVAILABLE ON AN AS-NEEDED BASIS.

• • •

[67] Q. AND DURING THAT TIME, IN YOUR VIEW, THE RELATIONSHIP OF WATER VALUE TO COST OF PUMPING REMAINED IN THE 10 TO 20 TIME DIFFERENTIAL?

A. AS I STATED EARLIER, THAT IS CORRECT. IT VARIES FROM A NINEFOLD DIFFERENTIAL UP TO SOMETHING IN SOME CASES SLIGHTLY IN EXCESS OF TWENTYFOLD.

ANOTHER ISSUE THAT PROFESSOR BARRY RAISED THAT, AGAIN, CONCEPTUALLY I AGREE

WITH IS THAT FARMERS DON'T ALWAYS HAVE INFORMATION ABOUT PROFITABILITY OF INVESTMENTS. HOWEVER, IN THIS CASE, FARMERS, AGAIN, HAD 28 YEARS IN WHICH TO OBSERVE THE BEHAVIOR OF THEIR NEIGHBORS, AND WE KNOW IN AGRICULTURE THAT THERE'S A RAPID DIFFUSION OF TECHNOLOGY. FARMERS ARE ASTUTE AND WILL STUDY WHAT THEIR NEIGHBORS ARE DOING IN TERMS OF CULTURAL PRACTICES AND OTHER ADAPTATIONS THAT PERHAPS FARMERS OR NEIGHBORS MAY MAKE, AND THEY WILL MIMIC THEM IN ORDER TO REMAIN COMPETITIVE.

SO WHILE IN 1950 – THROUGH THE EARLY YEARS THE FARMERS MAY HAVE BEEN SKEPTICAL ABOUT THE POTENTIAL BENEFITS OF WELLS, YOU'D THINK 28 YEARS IS AN ADEQUATE TIME FOR FARMERS TO OBSERVE THE BENEFITS OF WELLS IF THEY WERE AS GREAT AS IMPLIED IN THE DIFFERENTIAL BETWEEN THE VALUES THAT KANSAS IS CLAIMING FOR WATER AND THE COST [68] THAT KANSAS IS PROVIDING FOR OBTAINING THE WATER.

ANOTHER FACTOR THAT I BELIEVE PROFESSOR BARRY MENTIONED IS RISK, AND HE ALSO STATED THAT IRRIGATION IS A RISK-REDUCTION STRATEGY, WHICH I DEFINITELY AGREE WITH. IF YOU IRRIGATE, YOU REDUCE THE VARIABILITY OF YIELDS, AND YOU REDUCE THE VARIABILITY OF REVENUE, AND THAT'S GENERALLY HOW WE MEASURE RISKS IN AN AGRICULTURE SITUATION. IRRIGATION REDUCES THAT.

BUT I BELIEVE HE WENT ON TO SAY THAT SOME FARMERS, BECAUSE OF THEIR AVERSION TO RISK, THEY MAY DECIDE THAT THEY DON'T WANT TO TAKE A CHANCE ON COMMITTING THEIR CAPITAL TO A PARTICULAR INVESTMENT BECAUSE THEY AREN'T SURE OF THE RETURN. AND, AGAIN, I WOULD AGREE THAT RISK-AVERSE PEOPLE MIGHT BEHAVE DIFFERENTLY THAN A RISK NEUTRAL OR A RISK TAKER.

HOWEVER, RISK-AVERSE PEOPLE – BECAUSE THEY'RE RISK AVERSE DOES NOT MEAN THEY WILL NOT ACCEPT RISK. IT SIMPLY MEANS THAT THEY HAVE TO HAVE A HIGHER REWARD TO ACCEPT THAT RISK. AND AS I LOOK AT THIS DIFFERENTIAL, WHICH IS IN A SENSE THE REWARD FOR TAKING THE RISK OF PUTTING IN A WELL, THE MAGNITUDES ARE, AS WE'VE BEEN DISCUSSING, 9 TO 20 TIMES HIGHER THAN THE COST, AND THAT, AGAIN, WOULD SUGGEST TO ME THAT EVEN RISK-AVERSE PEOPLE COULD BE PERSUADED TO INVEST [69] IN A WELL WHEN CONFRONTED WITH SUCH A POTENTIAL PROFIT GAIN FROM THAT ACTION.

Q. LOOKING AGAIN AT TABLE 1 OF YOUR EXHIBIT 1203, YOU HAVE ACKNOWLEDGED, I BELIEVE, THAT THE VALUES WHICH YOU HAVE SHOWN ON THE TABLE ARE IN LARGE PART SHORT-RUN VALUES, NOT NECESSARILY INTRASEASONAL VALUES; IS THAT RIGHT?

A. THAT IS CORRECT. I BELIEVE I –

Q. DO YOU CONSIDER THEM, HOWEVER, TO BE USEFUL, NONETHELESS, AND IF SO, HOW OR WHY?

A. I DO CONSIDER THEM TO BE USEFUL. THEY ARE PART OF THE EVIDENCE I USED IN COMING TO THE OPINION THAT THE WATER VALUES ESTIMATED BY THE KANSAS EXPERTS WERE UNREASONABLY HIGH. THESE VALUES THAT I'VE REPORTED HERE COME FROM A RANGE OF SETTINGS AND OVER A DIFFERENT PERIOD OF YEARS. I'VE CORRECTED FOR THE YEARS BY ADJUSTING THESE BY THE P.R., PRICES RECEIVED, INDEX.

WHAT THESE VALUES TELL ME IS THAT COLLECTIVELY WE HAVE A RANGE OF WILLINGNESS TO PAY ESTIMATES IN THE LITERATURE. AGAIN, THESE REPRESENT FARMERS' WILLINGNESS TO PAY FOR WATER. AND THESE VALUES VARY FROM FAIRLY LOW VALUES IN SOME SETTINGS UP TO HIGHER VALUES FOR THE SAME CROP. AS I STATED IN MY ORIGINAL TESTIMONY, I DID NOT ANCHOR OR BASE MY OPINION ON ANY PARTICULAR VALUE IN THE LITERATURE. I WAS SIMPLY LOOKING AT THE RANGE OF VALUES TO SEE [70] WHAT OTHER STUDIES HAD DETERMINED FARMERS WOULD BE WILLING TO PAY FOR WATER.

SOME OF THESE STUDIES ARE IN AREAS WHERE THEY ARE USING WELL WATER. HENCE, THE TIMING WOULD BE BETTER THAN IN THE SURFACE-WATER-ONLY LANDS. SOME OF THESE ARE FROM AREAS WHERE THE YIELDS ARE HIGHER. SO YOU WOULD EXPECT THE VALUE TO BE HIGHER. CONVERSELY, IN THE KANSAS AREA WE HAVE AREAS THAT ARE UNDER A DEPLETION SITUATION. SO THAT WOULD MITIGATE IN THE OTHER DIRECTION.

THAT'S WHY YOU DON'T WANT TO PIN YOUR SEARCH FOR THE TRUTH ON ANY ONE VALUE. YOU HAVE TO USE SOME COMMON SENSE, THINK ABOUT HOW THESE WERE DERIVED OR DETERMINED, AND SEE HOW REPRESENTATIVE THEY ARE OF THE CONDITIONS UNDER WHICH YOU'RE DEALING. SO IF I LOOK AT THE BIASES OR THE EFFECTS OF CERTAIN THINGS THAT MAKE THESE NUMBERS HIGHER – I DIDN'T MEAN "BIAS" – IF I LOOK AT FORCES THAT MIGHT CAUSE SOME OF THESE ESTIMATES TO BE HIGHER IN SOUTHWEST KANSAS, I SHOULD ALSO LOOK AT THE CONDITIONS THAT MIGHT MAKE THE SOUTHWEST KANSAS VALUES HIGHER, AND I TRIED TO DO THAT BY CONSIDERING THAT, EVEN THOUGH THE YIELDS IN SOUTHWEST KANSAS ARE MUCH LOWER THAN OTHER AREAS, THEY ARE IN THIS DEFICIT STATE. SO THE WATER WOULD BE SOMEWHAT HIGHER.

* * *

A-81

Appendix Item 10

Excerpts from R.T. Vol. 208
January 20, 2000
(Cross Examination of Richard Adams)

[Pages 97-99]

• • •

[97] Q. LET'S TALK ABOUT YOUR TABLE 1.

• • •

Q. . . . YOUR TABLE 1 LISTS A NUMBER OF LITERATURE SOURCES THAT YOU LOCATED IN YOUR LITERATURE SEARCH; ISN'T THAT RIGHT?

A. YES, SIR.

Q. AND WE ARE IN AGREEMENT NOW THAT NONE OF THE VALUES THAT YOU LIST IN TABLE 1 ARE INTRASEASONAL OR SHORT-SHORT-RUN VALUES THAT ARE COMPARABLE TO THE VALUES THAT ARE RELEVANT TO THIS CASE?

A. I BELIEVE WHAT I HAVE TESTIFIED TO, MR. DRAPER, IS THAT THE VALUES REPORTED HERE WOULD BE CLASSIFIED OR CHARACTERIZED BY AN ECONOMIST AS SHORT-RUN VALUES, BUT I ALSO BELIEVE THAT I STATED THAT, IN A GENERAL SENSE, THESE VALUES MAY BE USED TO GET AN UNDERSTANDING OF THE VALUES FOR WATER ON THESE TYPES OF CROPS.

[98] I'LL GO ON FURTHER AND REVIEW WHAT I SAID EARLIER TODAY, AND THAT IS THAT IN DETERMINING WHETHER THESE VALUES WERE REASONABLE IN THIS SORT OF COMPARISON, I TRIED TO RECOGNIZE THAT THERE WERE FACTORS THAT WOULD BOTH INCREASE AND DECREASE THESE VALUES RELATIVE TO THE INTRASEASONAL VALUES IN KANSAS. AS I STATED, THESE VALUES IN

MANY CASES WERE COMING FROM STUDIES WHERE THEY WERE BASED UPON WELL IRRIGATION AND WOULD HAVE HAD A TIMELY SUPPLY OF WATER. THAT WOULD TEND TO MAKE THE VALUES HIGHER. THAT'S ALSO CONSISTENT WITH THE FACT THAT SOME OF THESE STUDIES HAD HIGHER YIELDS. AT THE SAME TIME, I STATED THAT THESE VALUES DO NOT REFLECT PERHAPS A DEFICIT STATUS OF THE SOME OF THE LANDS IN SOUTHWEST KANSAS.

SO I WAS USING MY JUDGMENT AND EXPERIENCE IN STATING THAT THERE'S OFFSETTING OR COUNTERVAILING INFLUENCES HERE AND THAT COLLECTIVELY YOU CAN LOOK AT THESE NUMBERS AND GET A SENSE OF WHAT WATER MIGHT BE WORTH. EVEN THOUGH THESE ARE SHORT-RUN VALUES, THEY HAVE SOME INFORMATION TO SHED ON THIS QUESTION OF WHAT WOULD WATER BE WORTH IN SOUTHWEST KANSAS.

Q. IT'S ALSO YOUR TESTIMONY, IS IT NOT, THAT THE AMOUNT BY WHICH THE INTRASEASONAL VALUES WILL BE HIGHER THAN THE SHORT-RUN VALUES IS NOT KNOWN?

A. I BELIEVE I STATED IT WAS AN EMPIRICAL QUESTION [99] AS TO WHETHER THE VALUE WOULD BE X DOLLARS OR Y DOLLARS HIGHER.

Q. BUT IT WOULD BE HIGHER, WOULDN'T IT?

A. IT COULD BE, OR THEY COULD POSSIBLY BE THE SAME, BUT THEY WOULD PROBABLY BE HIGHER, AND I BELIEVE I TESTIFIED TO THAT

UNDER CROSS . . . AND I DID STATE THAT CONCEPTUALLY I WOULD AGREE THAT THE INTRASEASONAL WOULD BE HIGHER THAN THE SHORT RUN, WHICH WOULD BE HIGHER THAN THE LONG RUN.

• • •

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Supreme Court of the United States

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

and

UNITED STATES OF AMERICA,

Defendant-Intervenor.

On Exceptions To The Third Report Of The Special Master

KANSAS' EXCEPTION AND BRIEF IN SUPPORT THEREOF

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QUESTION PRESENTED

Is there an exceptional circumstance in this case justifying partial denial of the prejudgment interest necessary to afford Kansas full compensation for Colorado's breach of the Arkansas River Compact?

EXCEPTION TO THE THIRD REPORT OF THE SPECIAL MASTER

The State of Kansas respectfully excepts to the recommendation of the Special Master that Kansas be denied prejudgment interest, on losses suffered in the years 1950-1968, as part of its damages for Colorado's violations of the Arkansas River Compact.

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BRIEF IN SUPPORT OF KANSAS' EXCEPTION TO THE THIRD REPORT OF THE SPECIAL MASTER

I. STATEMENT

The State of Kansas brought this original action against the State of Colorado to enforce the Arkansas River Compact, Act of May 31, 1949, Ch. 155, 63 Stat. 145 ("Compact"). The Compact is reprinted in the Appendix to this Brief. The Court granted Kansas leave to file its Complaint. *Kansas v. Colorado*, 475 U.S. 1079 (1986).

Special Master Arthur L. Littleworth, appointed in 1987, 484 U.S. 910 (1987), has filed three reports with the Court. The First Report recommended that the Court find Colorado liable for violating the Compact by allowing its water users to deplete the waters of the Arkansas River by well pumping. 513 U.S. 803 (1994). The Court overruled the Exceptions of the States to the First Report and determined in accordance with the Special Master's recommendation that Colorado had violated the Compact. *Kansas v. Colorado*, 514 U.S. 673, 693-694 (1995).

The Special Master submitted his Second Report recommending resolution of a number of remedy issues. 522 U.S. 803 (1997). The Court overruled Colorado's Exceptions to the Second Report without prejudice and returned the case to the Special Master for further proceedings. 522 U.S. 1073 (1998).

The Master has now submitted his Third Report, dated August 2000, documenting his ultimate recommendations with regard to the appropriate remedy for Colorado's past violations of the Compact. 69 U.S.L.W. 3257 (Oct. 10, 2000). The Special Master still has pending

before him proceedings principally concerning Colorado's future compliance.

A. The Arkansas River Basin

The headwaters of the Arkansas River rise on the eastern slope of the Rocky Mountains at an altitude above 14,000 feet, not far from the towns of Leadville and Aspen, Colorado. The river flows south and east, through the Royal Gorge, leaving the mountains near Canon City, Colorado and flowing eastward through Pueblo, La Junta and Lamar, Colorado and Garden City and Dodge City, Kansas. The Arkansas River then continues through the States of Kansas, Oklahoma and Arkansas, ultimately entering the Mississippi River southeast of Little Rock, Arkansas.

There are two major instream reservoirs, John Martin Reservoir and Pueblo Reservoir, that have been constructed on the mainstem of the Arkansas River in Colorado. Twenty-three canal systems divert from the mainstem in Colorado between Pueblo and the Kansas stateline, providing water to approximately 300,000 acres of irrigated land in Colorado. Six canal systems in Kansas divert water from the Arkansas River for the irrigation of approximately 44,000 acres in Kansas. See *Kansas v. Colorado*, 514 U.S. 673, 675-677 (1995); 2 Third Report App. 86, col. b. More than a thousand new large irrigation wells were drilled along the Arkansas River in Colorado after the adoption of the Compact. 1 Third Report 103. Pumping increased from 15,000 acre-feet per year prior to the Compact, *Kansas v. Colorado*, 514 U.S., at 689-691, to more

than 200,000 acre-feet per year after the adoption of the Compact, 1 Third Report 103.[1]

B. The Arkansas River Compact

In 1949, Kansas and Colorado approved, and Congress ratified, the Arkansas River Compact. 63 Stat. 145. See Appendix. The adoption of the Compact followed two decisions of this Court, *Kansas v. Colorado*, 206 U.S. 46 (1907), and *Colorado v. Kansas*, 320 U.S. 383 (1943), and the recommendation of the Court that the States seek to resolve their differences by negotiation pursuant to the Compact Clause of the Constitution. *Id.*, at 392; see U.S. Const., Art. I, § 10, cl. 3.

The Compact consists of nine articles. Its primary purposes, as stated in Article I, are to "[s]ettle existing disputes and remove causes of future controversy between the States of Colorado and Kansas, and between citizens of one and citizens of the other State, concerning waters of the Arkansas River" and to "[e]quitably divide and apportion" the waters of the Arkansas River and the benefits of John Martin Reservoir. A-1 to A-2.

Of principal relevance to this case is Article IV-D of the Compact, which provides:

> "This Compact is not intended to impede or prevent future beneficial development of the

---

[1] The acre-foot is the common unit in the United States for quantifying larger volumes of water. It is the amount of water covering an area of one acre one foot deep. It is equal to 325,851 gallons. The Supreme Court Courtroom's volume, within the columns, is approximately 3 1/3 acre-feet.

> Arkansas River by Federal or State agencies, by private enterprise, or by combinations thereof, which may involve construction of dams, reservoir, and other works for the purposes of water utilization and control, as well as the improved or prolonged functioning of existing works: Provided, that the waters of the Arkansas River . . . *shall not be materially depleted in usable quantity or availability* for use to the water users in Colorado and Kansas under this Compact *by such future development or construction.*" A-5 (emphasis added).

Article V apportions the benefits of water stored in John Martin Reservoir. A-5 to A-9. Article VII-A provides that the term "State" includes "any person . . . using, claiming or in any manner asserting any right to use" the waters of the Arkansas River under the authority of that State. A-10 to A-11.

C. Proceedings Leading to the Special Master's Third Report

The State of Kansas commenced this proceeding in late 1985, alleging violations of Article IV-D of the Compact. Trial commenced in 1990. The Special Master filed his First Report in July 1994. 513 U.S. 803 (1994). That report recommended that the Court determine that Colorado had violated Article IV-D of the Compact in the years after its adoption by allowing development of increased groundwater pumping which materially depleted usable flows of the Arkansas River. Colorado filed several Exceptions to the First Report, including one

based on laches. The Court overruled Colorado's Exceptions, held that Colorado had violated the Compact as a result of increased post-Compact groundwater pumping in Colorado, and remanded the case to the Special Master. *Kansas v. Colorado,* 514 U.S. 673, 687-89, 694-95 (1995).

On remand, the Special Master received further briefs and evidence and then filed his Second Report with the Court in September 1997. 522 U.S. 803 (1997). The Second Report made a number of recommendations to the Court, including that the Court approve the determinations of the Special Master that: (a) Colorado had depleted an aggregate of 420,071 acre-feet in violation of the Compact during the period 1950-1994; (b) if a suitable remedy in this case should include money damages, those damages should be based on Kansas' loss rather than upon any gain to Colorado, subject to the overriding consideration that the remedy provide a fair and equitable solution; (c) if the remedy in the case includes money damages, the Eleventh Amendment does not preclude damages to the State of Kansas from being based, in part, on losses incurred by its water users, again subject to the overall consideration of fairness; and (d) the unliquidated nature of Kansas' claim for damages does not bar the award of prejudgment interest, and the possible award of prejudgment interest would depend on the evidence presented in subsequent trial proceedings. Second Report 112-114.

Colorado filed two Exceptions to the Second Report. The Colorado Exceptions challenged the recommendations of the Special Master regarding the Eleventh Amendment and the possible award of prejudgment interest. Kansas and the United States filed briefs in opposition to Colorado's Exceptions. 1 Third Report 4.

The Court overruled the Exceptions of Colorado without prejudice to Colorado's right to renew those Exceptions at the conclusion of the Special Master's remedial proceedings. 522 U.S. 1073 (1998). Thereafter, the Special Master held trial on Colorado's violations for the two-year period 1995-1996 and on the remedy for Colorado's violations of the Compact from 1950 through 1994. The Special Master determined that violations had continued in 1995 and 1996 in an aggregate amount of 7,935 acre-feet. 2 Third Report, at App. 64.

With regard to past damages, Kansas sought compensation in money rather than water. Kansas presented evidence of losses in four categories: (1) increased pumping costs to Kansas farmers in the ditch service areas who were forced to replace depletions of surface water deliveries by pumping their wells; (2) regional increases (both past and future) in the cost of pumping due to reductions in groundwater elevations caused by depletions of usable stateline flows; (3) crop losses to farmers without wells in the ditch service areas caused by depletions of usable stateline flows that could not be replaced by well pumping; and (4) net secondary impacts on the Kansas economy resulting from the foregoing types of loss (1)-(3). The final Kansas quantification amounted to approximately $62 million. 1 Third Report 1.

Kansas also presented expert testimony on prejudgment interest and discounting. Several eminent economists, including a Nobel laureate, testified to the principle that money has a time value and to the need to apply that principle consistently to the facts of this case. They testified to the necessity of both compounding past

damages, and discounting future damages, to present value. *Id.*, at 89-92. Colorado did not dispute the validity of these principles. *Id.*, at 90, 93.

Colorado sought to repay in water over a 15-year period without interest. Colorado asserted that if repayment were to be in the form of money, it should be limited to approximately $9 million. *Id.*, at 2. The Special Master recommended repayment in money. *Id.*, at 108-119. Colorado also argued that Kansas should be denied prejudgment interest on any remedy, although it agreed that an award of damages for past losses should be adjusted for inflation. *Id.*, at 92-94.

Although, prior to the Second Report, Kansas had argued to the Special Master that the benefits derived by Colorado from its breach of the Compact would be a better measure of the appropriate remedy than Kansas' losses, the Special Master recommended that the remedy be measured by Kansas' losses. Second Report 75-84; 2 Third Report, at App. 1-10. Kansas filed no exception to the Special Master's recommendation, but did seek to submit evidence on Colorado's benefits for purposes of demonstrating that Kansas' claim based upon its losses, including prejudgment interest, was fair. When this evidence was excluded by the Special Master, Kansas made an offer of proof indicating that Colorado's benefits from violations of the Compact would be substantially greater than Kansas' losses. See 1 Third Report 2-3 ("Under the offer of proof, Kansas' damages would have amounted to $321,990,546"); 2 Third Report, at App. 6-7.

D. The Third Report

In his Third Report, the Special Master determined that Kansas incurred damages as a result of Colorado's depletion of an aggregate of 420,071 acre-feet of usable stateline flows over the years 1950-1994. 1 Third Report 1, 8-9, 12, 120. He recommended that Kansas' damages should be determined on the basis of the analyses used by the Kansas experts, *id.* at 120 (¶ 6), with several modifications. Certain modifications do not relate to prejudgment interest, and they are not challenged in this Exception. By Kansas' calculation, these uncontested modifications reduce the Kansas claim from $62 million to approximately $57 million.

The modification that Kansas does challenge here is the Special Master's partial denial of prejudgment interest. He found that from 1950 to 1968 both Kansas and Colorado were unaware that Colorado was violating the Compact inasmuch as neither State understood that material depletions of the Arkansas River's usable flows were occurring. *Id.*, at 100, 103, 106. He found that by 1968 Colorado knew or should have known that wells developed since the adoption of the Compact were causing material depletions of usable flows. *Id.*, at 103-104.

The Special Master recommended that, as a general proposition, Kansas' monetary damages should include prejudgment interest. *Id.*, at 120 (¶ 8). Thus, he recommended that the Court confirm his earlier determination that the unliquidated nature of Kansas' claim for damages does not bar the award of prejudgment interest. *Id.*, at 119 (¶ 4). Moreover, he found that the interest rates proposed by Kansas are appropriate to account for the

loss of use of money, noting that Colorado had offered no evidence of rates appropriate to that purpose. *Id.*, at 91, 107.

In determining that Kansas' damages should include prejudgment interest, however, the Special Master distinguished between damages incurred in the years 1950-1968, when neither State was aware that Colorado was breaching the Compact, and damages incurred after 1968, when Colorado knew or should have known of its breach. *Id.*, at 102-103. He found that Kansas should be compensated for its loss of use of money due as damages in the later period, so that damages from 1969 to the date of judgment should include interest at Kansas' proposed rates. *Id.*, at 107. In contrast, he found that it would be unfair to Colorado to compensate Kansas for its loss of use of funds owed as a result of damages incurred in the earlier period; thus, he recommended that damages suffered in the years 1950-1968 be adjusted only for inflation to 1998 values using the consumer price index. *Ibid.*

By Kansas' calculation, the effect of the Special Master's recommended limitation on prejudgment interest is to reduce Kansas' remaining claim of $57 million by some $19 million to approximately $38 million.

II. SUMMARY OF ARGUMENT

The Special Master correctly recognized the general rule that prejudgment interest should be awarded in a case such as this one, absent some exceptional circumstance. Two of this Court's leading decisions strongly support awarding Kansas prejudgment interest to compensate for its loss of use of money due as damages from Colorado's breach of the Compact to the date of judgment. *City of Milwaukee v. Cement Div., Nat'l Gypsum Co.*, 515 U.S. 189 (1995); *Texas v. New Mexico*, 482 U.S. 124 (1987).

The Special Master nevertheless recommended that Kansas not be compensated for its loss of use of money due as damages over an extended period of Colorado's violations of the Compact, namely, the years 1950-1968. He believed that it would be unfair to Colorado to afford Kansas full compensation for its injury. The Third Report discusses three circumstances that the Special Master seems to have deemed sufficiently exceptional to justify withholding prejudgment interest: first, that a "great length of time" has passed since Colorado began violating the Compact, producing what the Special Master considered to be startling results; second, that both States were unaware in the early years that Colorado was violating the Compact; and third, that it was the farmers of the two States, rather than the States themselves, who most directly experienced the benefits and losses resulting from the Compact violations. 1 Third Report 99-106.

None of these circumstances justifies withholding prejudgment interest. The fact that much time has passed since Colorado first violated the Compact is precisely the

reason for awarding prejudgment interest, not a reason for denying it. This is not a case in which the plaintiff inexcusably delayed bringing suit. This Court has previously ruled that Kansas was not guilty of laches during the period 1950-1968, *Kansas v. Colorado*, 514 U.S. 673, 689 (1995). Because Kansas is not at fault for the simple passage of time, its compensation should not be effectively reduced on account of that passage of time.

There is likewise no justification for withholding interest on the ground that Colorado, like Kansas, was unaware that Colorado was violating the Compact in the early years. Colorado's good-faith ignorance of its violations of the Compact would bear on the question of prejudgment interest if interest were awarded as a penalty for bad-faith conduct. But prejudgment interest is an element of just compensation, not a penalty. Colorado's good faith in the early years is therefore not a circumstance sufficient to justify withholding full compensation from Kansas for Colorado's breach of the Compact.

Finally, any reliance on the supposition that Colorado's farmers received most of the benefits of Colorado's Compact violations, and that Kansas' farmers incurred most of the harm, is misplaced. Article VII-A of the Compact rules out any distinction between the States and their respective water users. Indeed, the Court has already held, in this case and previously, that the defendant State is liable for a violation of an interstate compact arising from the actions of its water users.

III. ARGUMENT

A. Legal Principles Governing an Award of Prejudgment Interest

The determination whether to award prejudgment interest in this case is guided to a large extent by this Court's unanimous decision in *City of Milwaukee v. Cement Division, National Gypsum Co.*, 515 U.S. 189 (1995). As the Special Master recognized, although *City of Milwaukee* was an admiralty case, the decision is so "pointed that it must strongly influence the prejudgment interest issues." 2 Third Report App. 41. As *City of Milwaukee* articulates, the prejudgment interest inquiry is governed by traditional judge-made principles inasmuch as Congress has not enacted a statute on the subject. 515 U.S., at 194. The general rule in an admiralty case is that prejudgment interest should be awarded, subject to a limited exception for "peculiar" or "exceptional" circumstances. *Id.*, at 195. The presumption in favor of prejudgment interest is not confined, however, to the admiralty context. Rather, the Court has recognized the compensatory nature of prejudgment interest in other contexts, including contract cases in particular. *Id.*, at 195, n. 7; see *West Virginia v. United States*, 479 U.S. 305 (1987) (action to enforce State's contractual obligation); *Funkhouser v. J.B. Preston Co.*, 290 U.S. 163 (1933) (action for breach of sales contract).[2] The

[2] Lower courts have construed decisions of this Court such as *City of Milwaukee* and *West Virginia* as establishing the principle that prejudgment interest is not unique to any particular area of federal law, *e.g., Transmatic, Inc. v. Gulton Indus., Inc.*, 180 F.3d 1343, 1347 & n. 2 (Fed. Cir. 1999), but "is an ordinary part of any award under federal law," *In re Oil Spill by the Amoco Cadiz*, 954 F.2d 1279, 1331 (7th Cir. 1992) (per curiam); accord 1 Third Report 94-95 and cases cited there.

present case, too, involving Colorado's breach of the Arkansas River Compact, is in essence a contract case because " '[a] Compact is, after all, a contract.' " *Texas v. New Mexico*, 482 U.S. 124, 128 (1987) (quoting *Petty v. Tennessee-Missouri Bridge Comm'n*, 359 U.S. 275, 285 (1959) (Frankfurter, J., dissenting)). The general rule that prejudgment interest should be awarded serves to ensure that the injured party is fully compensated and, more specifically, that it is compensated " 'for the loss of use of money due as damages from the time the claim accrues until judgment is entered.' " *Id.*, at 195-196 (quoting *West Virginia v. United States*, 479 U.S. 305, 310-311, n. 2 (1987)).

An award of prejudgment interest is not automatic, but rests in the discretion of the tribunal passing on the subject. *City of Milwaukee*, 515 U.S., at 196.[3] As with other discretionary determinations, however, "the judge's decision must be supported by a circumstance that has relevance to the issue at hand." 515 U.S., at 196, n. 8 (citing Friendly, *Indiscretion About Discretion*, 31 EMORY L.J. 747 (1982)). The "most obvious" example of a relevant circumstance justifying a departure from the general rule is a plaintiff's " 'undue delay in prosecuting the lawsuit.' " *Id.*, at 196 (quoting *General Motors Corp. v. Devex Corp.*, 461 U.S. 648, 657 (1983)).

[3] The tribunal passing on the subject is, of course, this Court, not the Special Master. See *Kansas v. Colorado*, 514 U.S. 673, 691 (1995) ("[T]he ultimate responsibility for deciding what are correct findings of fact remains with the Court . . . ").

In contrast, and of particular pertinence here, a defendant's good-faith belief that it is not responsible for the plaintiff's loss is not such a circumstance. *Id.*, at 196-197. The defendant's good faith would carry significant weight if prejudgment interest were awarded to penalize bad-faith conduct. *Id.*, at 197. "But prejudgment interest is not awarded as a penalty; it is merely an element of just compensation." *Ibid.* Similarly, the defendant's good faith would have more weight if the Court were to adopt the "venerable" common-law rule that unliquidated claims do not bear interest. *Ibid.* But the common-law rule, which "has faced trenchant criticism for a number of years," does not square with the presumption in favor of prejudgment interest. *Id.*, at 197 & n. 9. A defendant's good faith thus is not sufficiently unusual to justify withholding prejudgment interest. *Id.*, at 198 (observing that legitimate difference of opinion on issue of liability "is merely a characteristic of most ordinary lawsuits").

The view that a defendant's good faith should relieve it of the obligation to pay prejudgment interest resembles an argument addressed and rejected in *Texas v. New Mexico*, 482 U.S. 124 (1987), an original action for breach of an interstate compact. The defendant State, New Mexico, contended that its long-held, good-faith belief that it was in compliance with the Pecos River Compact immunized it from any obligation to compensate Texas for adjudicated prejudgment violations. *Id.*, at 129. The Pecos River Compact, like the Arkansas River Compact, became effective with Congress' approval in 1949. 63 Stat. 159. The Court determined that New Mexico had underdelivered water in the years 1950-1983, *Texas v. New Mexico*, 482

U.S., at 127-128, as the Special Master here has found that Colorado underdelivered water in the years 1950-1996. The parties remained at odds, however, over the basic meaning of a key term in the Pecos River Compact until 1979, and New Mexico's obligation to deliver water remained unquantified and uncertain – that is to say, unliquidated – until 1984. *Id.*, at 127, 129. Two special masters recognized that New Mexico had acted in good faith. *Id.*, at 129. Nonetheless, the Court squarely rejected the proposition that New Mexico's good faith relieved it of the duty to perform its compact obligations:

> "[G]ood-faith differences about the scope of contractual undertakings do not relieve either party from performance. . . . There is often a retroactive impact when courts resolve contract disputes about the scope of a promisor's undertaking; parties must perform today or pay damages for what a court decides they promised to do yesterday and did not. In our view, New Mexico cannot escape liability for what has been adjudicated to be past failures to perform its duties under the Compact." *Ibid.*

Taken together, *City of Milwaukee* and *Texas v. New Mexico* make clear that a defendant State's good faith is not a circumstance relieving it of the obligation to pay full compensation for its breach of a compact. This remains true although the defendant State may have acted in good faith over an extended period of time such as is frequently involved in interstate water litigation. Prejudgment interest is an essential element of full compensation and should be awarded whether or not the defendant knew or should have known that it was breaching the compact.

This Court's decisions are consonant with well-recognized economic principles bearing on prejudgment interest. Kansas' economists testified, without contradiction by Colorado, that prejudgment interest is necessary to restore the parties to the *status quo ante*. Without it, the plaintiff is penalized by the loss of opportunity to invest the asset taken from it, and the defendant receives a windfall in the form of earnings from the invested asset. In other words, interest does no more than render an award of damages at its present value by replicating the value that the plaintiff would have received had the plaintiff had use of the lost asset at the time of the injury. Just as future damages must be discounted to present value in order not to *overcompensate* the plaintiff, so past damages must be compounded to present value in order not to *undercompensate* the plaintiff. Kansas' economists attested to the equivalency of discounting future damages and compounding past damages. Both operations are a function of the fact that money has a time value – a dollar today is worth less than a dollar yesterday and more than a dollar tomorrow. See 1 Third Report 89-92.

This Court, for its part, long ago observed, "It is self-evident that a given sum of money in hand is worth more than the like sum of money payable in the future." *Chesapeake & Ohio R. Co. v. Kelly*, 241 U.S. 485, 489 (1916). On this basis, the Court has "consistently recognized that 'damage awards in suits governed by federal law should be based on present value.' " *Monessen Southwestern R. Co. v. Morgan*, 486 U.S. 330, 339 (1988) (quoting *St. Louis Southwestern R. Co. v. Dickerson*, 470 U.S. 409, 412 (1985) (per curiam)). This Court has also recognized the economic truism that compounding past damages is as

essential to render a damages award at present value as is discounting of future damages. *Jones & Laughlin Steel Corp. v. Pfeifer*, 462 U.S. 523, 538, n. 22 (1983); accord *In re Oil Spill by the Amoco Cadiz*, 954 F.2d 1279, 1332 (7th Cir. 1992) (per curiam) (compounding past losses "is just the flip side of discounting" future losses); *In re Air Crash Disaster Near Chicago, Ill., on May 25, 1979*, 644 F.2d 633, 644 (7th Cir. 1981); *Moore-McCormack Lines, Inc. v. Richardson*, 295 F.2d 583, 594 (2d Cir. 1961); Charles T. McCormick, HANDBOOK ON THE LAW OF DAMAGES § 56, at 225 (1935).

B. The Court's Precedents Support a Complete Award of Prejudgment Interest in This Case.

The Special Master agreed, "in general, that prejudgment interest should be included in any damage award for violation of an interstate water compact." 1 Third Report 102. He cited *City of Milwaukee* and *Texas v. New Mexico*, among other authorities, in reaching this determination. Nevertheless, he stopped short of applying those decisions fully to this case. Positing that "without some limitation" an award of prejudgment interest produces "startling results," he settled on the view that "one fundamental standard still appears to remain – that prejudgment interest is given 'in response to considerations of fairness.' " *Id.*, at 99-100 (quoting *Board of Comm'rs of Jackson County v. United States*, 308 U.S. 343, 352 (1939)). In this case, he concluded, fairness "should relieve Colorado of the obligation to pay interest on damages from depletions during [the] 1950-68 period." *Id.*, at 106.

The Special Master did not suggest, however, that there is anything intrinsically unfair about prejudgment interest. On the contrary, he acknowledged that "a *denial* of prejudgment interest may be unfair, and should be justified." *Id.*, at 97; accord *City of Milwaukee*, 515 U.S., at 199 (rejecting contention that award of prejudgment interest is inequitable in a mutual fault situation, and observing that "a *denial* of prejudgment interest would be unfair") (emphasis in original). Thus, the Special Master's denial of prejudgment interest for the period 1950-1968 must find a justification in some exceptional circumstance rendering an award of interest unfair in this case. See *id.*, at 195.

The Special Master did not find that Kansas was guilty of undue delay in prosecuting this lawsuit, a circumstance that could justify a denial of prejudgment interest. See *City of Milwaukee*, 515 U.S., at 196. Indeed, this Court has previously concluded that Kansas showed no lack of diligence or inexcusable delay in bringing suit. *Kansas v. Colorado*, 514 U.S. 673, 689 (1995). Consistent with that conclusion, the Special Master found that "[n]either state in the early years saw any wrongdoing, or thought that Kansas was not receiving its compact share of usable flows of the Arkansas River." 1 Third Report 106; see also *id.*, at 100, 103.

The Special Master did, however, identify three circumstances that, in his view, make this case exceptional: (1) a "great length of time," now 50 years, has passed since Colorado began breaching the Compact, *id.*, at 99; (2) Colorado, like Kansas, was unaware in the early years that depletions were occurring in breach of the Compact,

id., at 103, 106,[4]; and (3) according to the Special Master, Colorado farmers experienced most of the benefits, while Kansas farmers experienced most of the losses, from Colorado's breach of the Compact. None of these circumstances supports the Special Master's decision to deny prejudgment interest for the years 1950-1968.

1. The Simple Passage of Time Since Colorado's Breach of the Compact Is Not a Reason to Deny Prejudgment Interest.

That a great length of time has passed is precisely the reason that prejudgment interest is needed – the greater the time, the greater the need. *In re Oil Spill by the Amoco Cadiz*, 954 F.2d, at 1334 (noting that passage of time "is a reason to award interest, not to deny it").[5] The Special Master acknowledged that an award of prejudgment interest cannot be called punitive, no matter how large it may be, because such an award is merely an element of

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[4] The Special Master appeared to view this case as *sui generis*, asserting that "there is no case in which prejudgment interest has been awarded that is at all similar to the facts in this dispute." 1 Third Report 98. It is true, of course, that prejudgment interest was not expressly awarded in *Texas v. New Mexico*, inasmuch as the case was settled. It is instructive, nevertheless, that this Court held New Mexico answerable for its breach of the Pecos River Compact over the 34 years from 1950 to 1983, despite New Mexico's protest that it had believed in good faith that it was in compliance. *Texas v. New Mexico*, 482 U.S., at 127-129.

[5] Accord *Anadarko Petroleum Corp. v. FERC*, 196 F.3d 1264, 1268 (D.C. Cir. 1999), modified on other grounds, 200 F.3d 867 (D.C. Cir.) (per curiam), cert. denied, 120 S.Ct. 2215 (2000); *In re Milwaukee Cheese Wis., Inc.*, 112 F.3d 845, 849 (7th Cir. 1997).

full compensation. 1 Third Report 100 (citing *In re Milwaukee Cheese Wis., Inc.*, 112 F.3d 845, 849 (7th Cir. 1997)). Nevertheless, he felt that calculating prejudgment interest over the period at issue in this case produces "startling results" and has a "dramatic impact" on Kansas' damages. *Id.*, at 100, 103. Significantly, the Special Master did not express any misgivings about Kansas' proposed *rates* of interest; on the contrary, he adopted those rates for purposes of the interest award that he did recommend, for the period 1969 to the date of judgment. *Id.*, at 91, 107. Thus, it was purely the cumulative effect of compounding interest over time, not any particular rate of compounding, that the Special Master found startling. See *id.*, at 100, 102-103.[6]

The impression that much interest has accrued, however, is no more a reason to deny interest than the fact that much time has passed. See *In re Oil Spill by the Amoco Cadiz*, 954 F.2d, at 1333 (rejecting argument that prejudgment interest should be denied on the ground that "this

[6] If the Special Master were justified in being startled by the effect of compounding past damages, he should also have been startled by the effect of discounting future damages. Due to the effect of discounting, Kansas did not even present a claim for the permanent loss of the beneficial use of 324,866 acre-feet of groundwater from the Ogallala aquifer due to Colorado's Compact violations. See 1 Third Report 3, 12. Since Kansas would have used that specific water only at the time in the future when no other groundwater is left to be pumped, the effect of discounting makes the present value of those future damages de minimis. Damages awards under federal law are properly based on present value regardless of whether, to some, the results are startling. See *Monessen Southwestern R. Co. v. Morgan*, 486 U.S. 330, 339 (1988).

has been a lengthy case, so that interest has mounted dramatically"). To say that prejudgment interest has grown dramatically is the same as to say that Kansas' loss of the use of its money has grown dramatically. That Kansas' loss has grown large is no reason to deny Kansas a remedy. To be sure, the decision to award interest is discretionary and fairness may inform the Court's exercise of its discretion. But the Special Master's startled reaction to the accrual of interest is not a proper basis on which to exercise discretion. See *Albemarle Paper Co. v. Moody*, 422 U.S. 405, 416 (1975) ("[D]iscretionary choices are not left to a court's 'inclination, but to its judgment; and its judgment is to be guided by sound legal principles' ") (quoting *United States v. Burr*, 25 F. Cas. 30, 35 (No. 14,692d) (C.C.D. Va. 1807) (Marshall, C.J.)); *Brown v. Allen*, 344 U.S. 443, 496 (1953) ("We must not invite the exercise of judicial impressionism. Discretion there may be, but 'methodized by analogy, disciplined by system.' . . . Discretion without a criterion for its exercise is authorization of arbitrariness") (Frankfurter, J.) (quoting Cardozo, THE NATURE OF THE JUDICIAL PROCESS 139, 141 (1921)). Whatever discretion a court may have on the issue, such discretion is not "authorization to decide who deserves the money more." *In re Milwaukee Cheese Wis., Inc.*, 112 F.3d 845, 849 (7th Cir. 1997).

2. Colorado's Lack of Knowledge of Its Breach of the Compact Is Not a Reason to Deny Prejudgment Interest.

As for the circumstance that both States were acting in good faith, unaware of depletions in the early years, *City of Milwaukee* and *Texas v. New Mexico* point to the

proper outcome. The objective of a contract remedy is to afford the injured party full compensation. Prejudgment interest is simply one element of that compensation. A defendant's ignorance of its breach does not justify a denial of prejudgment interest any more than it justifies a denial of other elements of compensation. The fact and extent of a plaintiff's injury do not depend on the defendant's state of mind, and neither should the plaintiff's remedy.

In focusing on Colorado's state of mind as well as the amount of interest that has accrued, the Special Master looked to considerations related not to making Kansas whole, but rather to mitigating the impact of the remedy on Colorado. Had the Special Master been charged with recommending a punitive remedy, such considerations might have been proper. But he disclaimed any intent to impose a punitive remedy. 1 Third Report 100. He acknowledged that " '[p]rejudgment interest is not awarded as a penalty; it is merely an element of just compensation.' " *Id.*, at 97 (quoting *City of Milwaukee*, 515 U.S., at 197).

Nonetheless, under the rubric of a "fundamental standard" of fairness, the Special Master applied concepts relevant to punitive damages to relieve Colorado of part of its obligation to compensate Kansas. See *id.*, at 99. For example, the Special Master's belief that it would be unfair to assess interest for an unknowing breach of a compact, 1 Third Report 100, 103, 106, is similar to the principle that an unintentional wrong is less reprehensible, and thus less punishable, than an intentional one. See *BMW of N. Am., Inc. v. Gore*, 517 U.S. 559, 575-580

(1996). Likewise, his startled reaction to the ratio of compounded to nominal damages,[7] 1 Third Report 100, is reminiscent of the rule that punitive damages should not be awarded at a ratio disproportionate to compensatory damages. See *BMW*, 517 U.S. at 580-583. This Court has inferred such limitations on a State's imposition of punitive damages from the Due Process Clause of the Fourteenth Amendment. *Id.*, at 568, 574 & n. 22. As far as Kansas is aware, however, this Court has not identified any comparable limitation on an aggrieved party's right to compensation. In short, limitations on punitive damages are not circumstances that have relevance to the issue at hand. See *City of Milwaukee*, 515 U.S., at 196, n. 8.

The problem inherent in the Special Master's reliance on vague "considerations of fairness" is that it ultimately is indistinguishable from a balancing of equities, an approach that this Court has firmly rejected. *West Virginia v. United States*, 479 U.S. 305, 311, n. 3 (1987). To be sure, this Court has been careful to point out that its rejection of an open-ended fairness standard does not preclude courts from applying an equitable consideration such as laches to bar a claim for prejudgment interest. *Ibid.* (citing *Board of Comm'rs of Jackson County v. United States*, 308 U.S. 343, 352-353 (1939)). But the laches doctrine, as a limitation on prejudgment interest, is long-established and well-defined. See, *e.g.*, *Board of Comm'rs*, 308 U.S., at 352-353; *Redfield v. Bartels*, 139 U.S. 694, 701 (1891); *Redfield v. Ystalyfera Iron Co.*, 110 U.S. 174, 176 (1884). It

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[7] The Special Master defined "nominal" damages as "the actual dollar value when the damage occurred." 1 Third Report 2.

presents a circumstance that *is* relevant to whether the plaintiff is entitled to compensation. *City of Milwaukee*, 515 U.S., at 196. A plaintiff's undue delay in bringing suit properly limits the plaintiff's right to compensation because it "injures the [defendant] by forcing it to act as an uncompensated trustee or investment manager." *In re Milwaukee Cheese Wis., Inc.*, 112 F.3d, at 849; accord *Williamson v. Handy Button Mach. Co.*, 817 F.2d 1290, 1298 (7th Cir. 1987). A relevant and well-defined limitation such as laches stands on a different footing than a judge's subjective notion of whether it is fair to award interest in a given case.

The Special Master recognized, consistent with this Court's prior ruling, that Kansas was not guilty of laches because there was a "general lack of knowledge in the early years" that Colorado was breaching the Compact. 1 Third Report 106. He felt that the "same degree of fairness" that protected Kansas from a finding of laches should now protect Colorado from the obligation to compensate Kansas for its lost use of money during the period 1950-1968. *Ibid*. That conclusion, however, conflates two very different principles. As a matter of logic as well as fairness, a general lack of knowledge that the plaintiff has a claim is relevant to, and indeed dispositive of, the defense of laches because an essential element of the defense is a plaintiff's "lack of diligence" or "neglect to assert a right or claim." *Kansas v. Colorado*, 514 U.S. 673, 687 (1995). In contrast, the same general lack of knowledge is irrelevant to the issue of whether the plaintiff should be compensated for its loss. Whether or not the parties had any inkling of Colorado's breach of the Compact in the early years, the fact remains that Colorado had

use of both water, an asset belonging to Kansas, and the income that it generated. The Special Master himself recognized that Colorado derived and retained this benefit. 1 Third Report 101 ("[W]e should not be oblivious to Colorado's use of the water over this long period of years"). It does not follow as a matter of logic or fairness that Colorado should be relieved of the obligation to restore the value of what it took because at one time the parties were unaware that Colorado was doing the taking.[8]

3. The Effect of Colorado's Breach on the Farmers of Each State Is Not a Reason to Deny Prejudgment Interest.

Finally, an additional circumstance noted in the Special Master's report is his belief that Colorado farmers – as opposed to the State or its subdivisions – received most of the benefits of Colorado's breach of the Compact, while Kansas farmers incurred most of the losses. *Id.*, at

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[8] In this regard, the Special Master was not consistent in his application of his own precepts. Without explanation, he determined that no compensation should be paid for Kansas' loss of use of money *incurred after 1968* on account of nominal damages suffered in the years 1950-1968, notwithstanding his own finding that Colorado knew or should have known of its breach by 1968. 1 Third Report 106-107; see *id.*, at 103. For the 32 years from 1969 to the present, Colorado has delayed payment of all pre-1969 damages. Even if a defendant's good-faith ignorance of its breach were a valid reason to deny prejudgment interest, it would not justify the Special Master's recommendation to deny Kansas compensation for its loss of use of money after 1968, when Colorado could no longer claim ignorance.

101. It is unclear what significance the Special Master attributed to this issue. He evidently did not consider it determinative, inasmuch as it did not prevent him from recommending an award of prejudgment interest for the later years. He may have been concerned that Colorado's state government itself did not have most of the benefits of its Compact breach in hand and so could not invest the money to pay for an eventual interest award. See 1 Third Report 101. But in view of the Special Master's finding that Colorado was unaware of its breach in the years 1950-1968 – and his conclusion that Colorado should therefore be relieved of the obligation to pay interest for those years – Colorado's ability or inability to set aside money to meet an interest obligation would seem to be beside the point.

At any rate, the Compact's express language does not admit of a distinction between a State and its water users. Rather, Article VII-A defines "State" to include "any person . . . using, claiming or in any manner asserting any right to use" the waters of the Arkansas River under the authority of that State. A-10 to A-11. Moreover, consistent with this definition is the Compact's purpose to resolve disputes and controversies, not only between the States as such, but also "between citizens of one and citizens of the other State." Art. I, at A-1. Kansas, as comprised of both its state government and its water users, indisputedly was denied the opportunity to invest the asset taken from it. As noted above, the Special Master himself recognized that Colorado has long had use of money that rightfully belonged to Kansas. 1 Third Report 101. The manner in which the people of Colorado chose to distribute the proceeds of the wrongfully appropriated water

has no bearing on whether Kansas should be compensated for what was taken.

This Court has previously determined in this case that Colorado bears liability for the actions of its water users. *Kansas v. Colorado*, 514 U.S. 673, 693-694 (1995). Implicit in that ruling is the premise that sovereign States stand in their citizens' stead in an original action such as this one. In *Texas v. New Mexico*, this Court noted that a plaintiff State represents its citizens in seeking enforcement of an interstate compact:

> "[T]he basis on which Texas was permitted to bring this original action is that enforcement of the Compact was of such general public interest that the sovereign State was a proper plaintiff. See *Maryland v. Louisiana*, 451 U.S. 725, 735-739 (1981). It is wholly consistent with that view that the State should recover any damages that may be awarded, money it would be free to spend in the way it determines is in the public interest." 482 U.S. 124, 132, n. 7 (1987).

If a plaintiff State in an original action properly recovers damages on behalf of "those who were hurt," *ibid.*, it follows that a defendant State must answer for the actions of its citizens who inflicted the harm. Indeed, as just noted, the Compact expressly holds Colorado answerable for the actions of any person "using, claiming or in any manner asserting any right to use" the waters of the Arkansas River under Colorado's authority. A-10 to A-11. Furthermore, the Court has not qualified its commitment to provide a complete remedy for breach of a compact on the basis of whether the defendant State itself or its citizens inflicted the harm. See *Texas v. New Mexico*,

482 U.S. at 129. Prejudgment interest should be awarded as one element of such a remedy.

IV. CONCLUSION

The Exception of the State of Kansas to the Third Report of the Special Master should be sustained.

Respectfully submitted,

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APPENDIX

ARKANSAS RIVER COMPACT, 1948

The State of Colorado and the State of Kansas, parties signatory to this Compact (hereinafter referred to as "Colorado" and "Kansas", respectively, or individually as a "State", or collectively as the "States") having resolved to conclude a compact with respect to the waters of the Arkansas River, and being moved by considerations of interstate comity, having appointed commissioners as follows: "Henry C. Vidal, Gail L. Ireland, and Harry B. Mendenhall, for Colorado; and George S. Knapp, Edward F. Arn, William E. Leavitt, and Roland H. Tate, for Kansas"; and the consent of the Congress of the United States to negotiate and enter into an interstate compact not later than January 1, 1950, having been granted by Public Law 34, 79th Congress, 1st Session, and pursuant thereto the President having designated Hans Kramer as the representative of the United States, the said commissioners for Colorado and Kansas, after negotiations participated in by the representatives of the United States, have agreed as follows:

ARTICLE I

The major purposes of this Compact are to:

A. Settle existing disputes and remove causes of future controversy between the States of Colorado and Kansas, and between citizens of one and citizens of the other State, concerning the waters of the Arkansas River and their control, conservation and utilization for irrigation and other beneficial purposes.

B. Equitably divide and apportion between the States of Colorado and Kansas the waters of the Arkansas River and their utilization as well as the benefits arising from the construction, operation and maintenance by the United States of John Martin Reservoir Project for water conservation purposes.

ARTICLE II

The provisions of this Compact are based on (1) the physical and other conditions peculiar to the Arkansas River and its natural drainage basin, and the nature and location of irrigation and other developments and facilities in connection therewith; (2) the opinion of the United States Supreme Court entered December 6, 1943, in the case of *Colorado v. Kansas* (320 U.S. 383) concerning the relative rights of the respective States in and to the use of waters of the Arkansas River; and (3) the experience derived under various interim executive agreements between the two States apportioning the waters released from the John Martin Reservoir as operated by the Corps of Engineers.

ARTICLE III

As used in this Compact:

A. The word "Stateline" means the geographical boundary line between Colorado and Kansas.

B. The term "waters of the Arkansas River" means the waters originating in the natural drainage basin of the Arkansas River, including its tributaries, upstream from

the Stateline, and excluding waters brought into the Arkansas River Basin from other river basins.

C. The term "Stateline flow" means the flow of waters of the Arkansas River as determined by gaging stations located at or near the Stateline. The flow as determined by such stations, whether located in Colorado or Kansas, shall be deemed to be the actual Stateline flow.

D. "John Martin Reservoir Project" is the official name of the facility formerly known as Caddoa Reservoir Project, authorized by the Flood Control Act of 1936, as amended, for construction, operation and maintenance by the War Department, Corps of Engineers, later designated as the Corps of Engineers, Department of the Army, and herein referred to as the "Corps of Engineers". "John Martin Reservoir" is the water storage space created by "John Martin Dam".

E. The "flood control storage" is that portion of the total storage space in John Martin Reservoir allocated to flood control purposes.

F. The "conservation pool" is that portion of the total storage space in John Martin Reservoir lying below the flood control storage.

G. The "ditches of Colorado Water District 67" are those ditches and canals which divert water from the Arkansas River or its tributaries downstream from John Martin Dam for irrigation use in Colorado.

H. The term "river flow" means the sum of the flows of the Arkansas and the Purgatoire Rivers into John Martin Reservoir as determined by gaging stations appropriately located above said Reservoir.

I. The term "the Administration" means the Arkansas River Compact Administration established under Article VIII.

ARTICLE IV

Both States recognize that:

A. This Compact deals only with the waters of the Arkansas River as defined in Article III.

B. This Compact is not concerned with the rights, if any, of the State of New Mexico or its citizens in and to the use in New Mexico of waters of Trinchera Creek or other tributaries of the Purgatoire River, a tributary of the Arkansas River.

C. (1) John Martin Dam will be operated by the Corps of Engineers to store and release the waters of the Arkansas River in and from John Martin Reservoir for its authorized purposes.

(2) The bottom of the flood control storage is presently fixed by the Chief of Engineers, U.S. Army, at elevation 3,851 feet above mean sea level. The flood control storage will be operated for flood control purposes and to those ends will impound or regulate the streamflow volumes that are in excess of the then available storage capacity of the conservation pool. Releases from the flood control storage may be made at times and rates determined by the Corps of Engineers to be necessary or advisable without regard to ditch diversion capacities or requirements in either or both States.

(3) The conservation pool will be operated for the benefit of water users in Colorado and Kansas, both

upstream and downstream from John Martin Dam, as provided in this Compact. The maintenance of John Martin Dam and appurtenant works may at times require the Corps of Engineers to release water then impounded in the conservation pool or to prohibit the storage of water therein until such maintenance work is completed. Flood control operation may also involve temporary utilization of conservation storage.

D. This Compact is not intended to impede or prevent future beneficial development of the Arkansas River basin in Colorado and Kansas by Federal or State agencies, by private enterprise, or by combinations thereof, which may involve construction of dams, reservoir, and other works for the purpose of water utilization and control, as well as the improved or prolonged functioning of existing works: Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction.

ARTICLE V

Colorado and Kansas hereby agree upon the following basis of apportionment of the waters of the Arkansas River:

A. Winter storage in John Martin Reservoir shall commence on November 1st of each year and continue to and include the next succeeding March 31st. During said period all water entering said reservoir up to the limit of the then available conservation capacity shall be stored: Provided, that Colorado may demand releases of water

equivalent to the river flow, but such releases shall not exceed 100 c.f.s. (cubic feet per second) and water so released shall be used without avoidable waste.

B. Summer storage in John Martin Reservoir shall commence on April 1st of each year and continue to and include the next succeeding October 31st. During said period, except when Colorado water users are operating under decreed priorities as provided in paragraphs F and G of this Article, all water entering said reservoir up to the limit of the then available conservation capacity shall be stored: Provided, that Colorado may demand releases of water equivalent to the river flow up to 500 c.f.s., and Kansas may demand releases of water equivalent to that portion of the river flow between 500 c.f.s, and 750 c.f.s., irrespective of releases demanded by Colorado.

C. Releases of water stored pursuant to the provisions of paragraphs A and B of this Article shall be made upon demands by Colorado and Kansas concurrently or separately at any time during the summer storage period. Unless increases to meet extraordinary conditions are authorized by the Administration, separate releases of stored water to Colorado shall not exceed 750 c.f.s., separate releases of stored water to Kansas shall not exceed 500 c.f.s., and concurrent releases of stored water shall not exceed a total of 1,250 c.f.s.: Provided, that when water stored in the conservation pool is reduced to a quantity less than 20,000 acre-feet, separate releases of stored water to Colorado shall not exceed 600 c.f.s., separate releases of stored water to Kansas shall not exceed 400 c.f.s., and concurrent releases of stored water shall not exceed 1,000 c.f.s.

D. Releases authorized by paragraphs A, B and C of this Article, except when all Colorado water users are operating under decreed priorities as provided in paragraphs F and G of this Article, shall not impose any call on Colorado water users that divert waters of the Arkansas River upstream from John Martin Dam.

E. (1) Releases of stored water and releases of river flow may be made simultaneously upon the demands of either or both States.

(2) Water released upon concurrent or separate demands shall be applied promptly to beneficial use unless storage thereof downstream is authorized by the Administration.

(3) Releases of river flow and of stored water to Colorado shall be measured by gaging stations located at or near John Martin Dam and the releases to which Kansas is entitled shall be satisfied by an equivalent in Stateline flow.

(4) When water is released from John Martin Reservoir appropriate allowances as determined by the Administration shall be made for the intervals of time required for such water to arrive at the points of diversion in Colorado and at the Stateline.

(5) There shall be no allowance or accumulation of credits or debits for or against either State.

(6) Storage, releases from storage and releases of river flow authorized in this Article shall be accomplished pursuant to procedures prescribed by the Administration under the provisions of Article VIII.

F. In the event the Administration finds that within a period of fourteen (14) days the water in the conservation pool will be or is liable to be exhausted, the Administration shall forthwith notify the State Engineer of Colorado, or his duly authorized representative, that commencing upon a day certain within said fourteen (14) day period, unless a change of conditions justifies cancellation or modification of such notice, Colorado shall administer the decreed rights of water users in Colorado Water District 67 as against each other and as against all rights now or hereafter decreed to water users diverting upstream from John Martin Dam on the basis of relative priorities in the same manner in which their respective priority rights were administered by Colorado before John Martin Reservoir began to operate and as though John Martin Dam had not been constructed. Such priority administration by Colorado shall be continued until the Administration finds that water is again available in the conservation pool for release as provided in this Compact, and timely notice of such finding shall be given by the Administration to the State Engineer of Colorado or his duly authorized representative: Provided, that except as controlled by the operation of the preceding provisions of this paragraph and other applicable provisions of this Compact, when there is water in the conservation pool the water users upstream from John Martin Reservoir shall not be affected by the decrees to the ditches in Colorado Water District 67. Except when administration in Colorado is on a priority basis the water diversions in Colorado Water District 67 shall be administered by Colorado in accordance with distribution agreements made

from time to time between the water users in such District and filed with the Administration and with the State Engineer of Colorado or, in the absence of such agreement, upon the basis of the respective priority decrees, as against each other, in said District.

G. During periods when Colorado reverts to administration of decreed priorities, Kansas shall not be entitled to any portion of the river flow entering John Martin Reservoir. Waters of the Arkansas River originating in Colorado which may flow across the Stateline during such periods are hereby apportioned to Kansas.

H. If the usable quantity and available for use of the waters of the Arkansas River to water users in Colorado Water District 67 and Kansas will be thereby materially depleted or adversely affected, (1) priority rights now decreed to the ditches of Colorado Water District 67 shall not hereafter be transferred to other water districts in Colorado or to points of diversion or places of use upstream from John Martin Dam; and (2) the ditch diversion rights from the Arkansas River in Colorado Water District 67, and of Kansas ditches between the Stateline and Garden City shall not hereafter be increased beyond the total present rights of said ditches, without the Administration, in either case (1) or (2), making findings of fact that no such depletion or adverse effect will result from such proposed transfer or increase. Notice of legal proceedings for any such proposed transfer or increase shall be given to the Administration in the manner and within the time provided by the laws of Colorado or Kansas in such cases.

ARTICLE VI

A. (1) Nothing in this Compact shall be construed as impairing the jurisdiction of Kansas over the waters of the Arkansas River that originate in Kansas and over the waters that flow from Colorado across the Stateline into Kansas.

(2) Except as otherwise provided, nothing in this Compact shall be construed as supplanting the administration by Colorado of the rights of appropriators of waters of the Arkansas River in said State as decreed to said appropriators by the courts of Colorado, nor as interfering with the distribution among said appropriators by Colorado, nor as curtailing the diversion and use for irrigation and other beneficial purposes in Colorado of the waters of the Arkansas River.

B. Inasmuch as the Frontier Canal diverts waters of the Arkansas River in Colorado west of the Stateline for irrigation uses in Kansas only, Colorado concedes to Kansas and Kansas hereby assumes exclusive administrative control over the operation of the Frontier Canal and its headworks for such purposes, to the same extent as though said works were located entirely within the State of Kansas. Water carried across the Stateline in the Frontier Canal or another similarly situated canal shall be considered to be part of the Stateline flow.

ARTICLE VII

A. Each State shall be subject to the terms of this Compact. Where the name of the State or the term "State" is used in this Compact these shall be construed to

include any person or entity of any nature whatsoever using, claiming or in any manner asserting any right to the use of the waters of the Arkansas River under the authority of that State.

B. This Compact establishes no general principle or precedent with respect to any other interstate stream.

C. Wherever any State or Federal official or agency is referred to in this Compact such reference shall apply to the comparable official or agency succeeding to their duties and functions.

ARTICLE VIII

A. To administer the provisions of this Compact there is hereby created an interstate agency to be known as the Arkansas River Compact Administration herein designated as "The Administration."

B. The Administration shall have power to:

(1) Adopt, amend and revoke by-laws, rules and regulations consistent with the provisions of this Compact;

(2) Prescribe procedures for the administration of this Compact: Provided, that where such procedures involve the operation of John Martin Reservoir Project they shall be subject to the approval of the District Engineer in charge of said Project;

(3) Perform all functions required to implement this Compact and to do all things necessary, proper or convenient in the performance of its duties.

C. The membership of the Administration shall consist of three representatives from each State who shall be appointed by the respective Governors for a term not to exceed four years. One Colorado representative shall be a resident of and water right owner in Water Districts 14 or 17, one Colorado representative shall be a resident of and water right owner in Water District 67, and one Colorado representative shall be the Director of the Colorado Water Conservation Board. Two Kansas representatives shall be residents of and water right owners in the counties of Finney, Kearny or Hamilton, and one Kansas representative shall be the chief State official charged with the administration of water rights in Kansas. The President of the United States is hereby requested to designate a representative of the United States, and if a representative is so designated he shall be an ex-officio member and act as chairman of the Administration without vote.

D. The State representatives shall be appointed by the respective Governors within thirty days after the effective date of this Compact. The Administration shall meet and organize within sixty days after such effective date. A quorum for any meeting shall consist of four members of the Administration: Provided, that at least two members are present from each State. Each State shall have but one vote in the Administration and every decision, authorization or other action shall require unanimous vote. In case of a divided vote on any matter within the purview of the Administration, the Administration may, by subsequent unanimous vote, refer the matter for arbitration to the Representative of the United States or other arbitrator or arbitrators, in which event

the decision made by such arbitrator or arbitrators shall be binding upon the Administration.

E. (1) The salaries, if any, and the personal expenses of each member shall be paid by the government which he represents. All other expenses incident to the administration of this Compact which are not paid by the United States shall be borne by the States on the basis of 60 per cent by Colorado and 40 per cent by Kansas.

(2) In each even numbered year the Administration shall adopt and transmit to the Governor of each State its budget covering anticipated expenses for the forthcoming biennium and the amount thereof payable by each State. Each State shall appropriate and pay the amount due by it to the Administration.

(3) The Administration shall keep accurate accounts of all receipts and disbursements and shall include a statement thereof, together with a certificate of audit by a certified public accountant, in its annual report. Each State shall have the right to make an examination and audit of the accounts of the Administration at any time.

F. Each State shall provide such available facilities, equipment and other assistance as the Administration may need to carry out its duties. To supplement such available assistance the Administration may employ engineering, legal, clerical, and other aid as in its judgment may be necessary for the performance of its functions. Such employees shall be paid by and be responsible to the Administration, and shall not be considered to be employees of either State.

G. (1) The Administration shall cooperate with the chief official of each State charged with the administration of water rights and with Federal agencies in the systematic determination and correlation of the facts as to the flow and diversion of the waters of the Arkansas River and as to the operation and siltation of John Martin Reservoir and other related structures. The Administration shall cooperate in the procurement, interchange, compilation and publication of all factual data bearing upon the administration of this Compact without, in general, duplicating measurements, observations or publications made by State or Federal agencies. State officials shall furnish pertinent factual data to the Administration upon its request. The Administration shall, with the collaboration of the appropriate Federal and State agencies, determine as may be necessary from time to time, the location of gaging stations required for the proper administration of this Compact and shall designate the official records of such stations for its official use.

(2) The Director, U.S. Geological Survey, the Commissioner of Reclamation and the Chief of Engineers, U.S. Army, are hereby requested to collaborate with the Administration and with appropriate State officials in the systematic determination and correlation of data referred to in paragraph G(1) of this Article and in the execution of other duties of such officials which may be necessary for the proper administration of this Compact.

(3) If deemed necessary for the administration of this Compact, the Administration may require the installation and maintenance, at the expense of water users, of measuring devices of approved type in any ditch or group of ditches diverting water from the Arkansas

River in Colorado or Kansas. The chief official of each State charged with the administration of water rights shall supervise the execution of the Administration's requirements for such installations.

H. Violation of any of the provisions of this Compact or other actions prejudicial thereto which come to the attention of the Administration shall be promptly investigated by it. When deemed advisable as the result of such investigation, the Administration may report its findings and recommendations to the State official who is charged with the administration of water rights for appropriate action, it being the intent of this Compact that enforcement of its terms shall be accomplished in general through the State agencies and officials charged with the administration of water rights.

I. Findings of fact made by the Administration shall not be conclusive in any court or before any agency or tribunal but shall constitute prima facie evidence of the facts found.

J. The Administration shall report annually to the Governors of the States and to the President of the United States as to matters within its purview.

ARTICLE IX

A. This Compact shall become effective when ratified by the Legislature of each State and when consented to by the Congress of the United States by legislation providing substantially, among other things, as follows:

"Nothing contained in this Act or in the Compact herein consented to shall be construed as impairing or

affecting the sovereignty of the United States or any of its rights or jurisdiction in and over the area or waters which are the subject of such Compact: Provided, that the Chief of Engineers is hereby authorized to operate the conservation features of the John Martin Reservoir Project in a manner conforming to such Compact with such exceptions as he and the Administration created pursuant to the Compact may jointly approve."

B. This Compact shall remain in effect until modified or terminated by unanimous action of the States and in the event of modification or termination all rights then established or recognized by this Compact shall continue unimpaired.

IN WITNESS WHEREOF, The commissioners have signed this Compact in triplicate original, one of which shall be forwarded to the Secretary of State of the United States of America and one of which shall be forwarded to the Governor of each signatory State.

Done in the City and County of Denver, in the state of Colorado, on the fourteenth day of December, in the Year of our Lord One Thousand Nine Hundred and Forty-eight.

Henry C. Vial
Gail L. Ireland
Harry B. Mendenhall
Commissioners for Colorado

George S. Knapp
Edward F. Arn
William E. Leavitt
Roland H. Tate
Commissioners for Kansas

Attest:

Warden L. Noe
Secretary

Approved:

Hans Kramer
Representative of the United States

Supreme Court, U.S.
FILED
JAN 3 2001

No. 105, Original

In the Supreme Court of the United States

STATE OF KANSAS, PLAINTIFF

v.

STATE OF COLORADO

ON EXCEPTIONS TO THE THIRD REPORT OF THE SPECIAL MASTER

BRIEF FOR THE UNITED STATES IN OPPOSITION TO THE EXCEPTIONS OF KANSAS AND COLORADO

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QUESTIONS PRESENTED

The United States will address the following questions:

1. Whether a money damages remedy based, in part, on the aggregate losses incurred by past, present, and future Kansas water users due to Colorado's depletion of stateline flows of the Arkansas River violates the Eleventh Amendment. (Colorado Exception No. 1).

2. Whether the Special Master erred in recommending that a money damages remedy include prejudgment interest beginning in 1969. (Colorado Exceptions Nos. 2 & 3; Kansas Exception).

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STATEMENT

The State of Kansas brought this original action against the State of Colorado to resolve disputes under the Arkansas River Compact (Compact), Act of May 31, 1949, ch. 155, 63 Stat. 145. This Court granted Kansas leave to file its complaint, *Kansas* v. *Colorado*, 475 U.S. 1079 (1986), and the Court appointed the Honorable Wade H. McCree, Jr., to serve as the Special Master. 478 U.S. 1018 (1986). Upon Judge McCree's death, the Court appointed Arthur L. Littleworth as the Special Master, 484 U.S. 910 (1987). Special Master Littleworth granted the United States' unopposed motion for leave to intervene in the action, conducted a trial limited to questions of liability, and submitted a report, which recommended that the Court find Colorado had violated the Compact in certain respects. 513 U.S. 803

(1994). This Court overruled the exceptions of both Kansas and Colorado to the Master's First Report. 514 U.S. 673 (1995).

The Master subsequently submitted a Second Report that addressed preliminary issues respecting a remedy, and the Court invited the parties to file exceptions. 522 U.S. 803 (1997). Colorado filed two exceptions, which were overruled without prejudice to Colorado's right to renew those exceptions at the conclusion of the remedy phase of the case. 522 U.S. 1073 (1998).

After further proceedings, including a trial on the appropriate remedy for Colorado's violations of the Compact, the Master issued a Third Report, dated August 2000, containing his recommended remedy for Colorado's violations of the Compact. 121 S. Ct. 294. Both Kansas and Colorado have filed exceptions to the recommended remedy. The United States files this brief to provide the Court with the federal government's perspective on the parties' exceptions to the Master's Third Report.

1. The Arkansas River Basin

The Arkansas River originates on the east slope of the Rocky Mountains in central Colorado and flows south and then east across Colorado and into Kansas. It receives significant in-flows from the Purgatoire River, its major tributary in Colorado, which originates in the Sangre de Cristo mountains in southern Colorado near the New Mexico border. The Purgatoire River flows in a notheasterly direction to join the Arkansas River about 60 miles west of the Kansas border, at Las Animas, Colorado. See *Kansas* v. *Colorado*, 514 U.S. 673, 675-676 (1995).

The United States has constructed three water storage projects on this river system. The John Martin Reservoir, located immediately east of the juncture of the Purgatoire and Arkansas Rivers in Colorado, is operated by the Army Corps of Engineers to control floods and to provide storage water in accordance with the Arkansas River Compact. It has a storage capacity of approximately 700,000 acre-feet. 514 U.S. at 677. The Pueblo Reservoir, located on the Arkansas River about 150 miles upstream of the Kansas border near Pueblo, Colorado, is managed by the Department of the Interior's Bureau of Reclamation as part of the Fryingpan-Arkansas Project. It has a storage capacity of approximately 357,000 acre-feet. *Ibid.* The Trinidad Reservoir, located on the Purgatoire River near Trinidad, Colorado, is jointly managed by the Army Corps of Engineers and the Bureau of Reclamation to control floods and to provide storage water for use by the Bureau of Reclamation's Trinidad Project. It has a storage capacity of approximately 114,000 acre-feet. *Ibid.*

Twenty-three canal systems in Colorado divert water from the Arkansas River for irrigation. Fourteen of those systems are located upstream from John Martin Reservoir, and four of those systems have associated privately-owned, off-channel water storage facilities. Six canal systems in Kansas operate between the Colorado border and Garden City. See 514 U.S. at 677.

2. The Arkansas River Compact

The Arkansas River Compact apportions the Arkansas River between the States of Kansas and Colorado. The Compact was an outgrowth of two original actions that the States had filed in this Court disputing their

respective entitlements to use of the Arkansas River. See 514 U.S. at 678. In each of those cases, the Court denied Kansas's request for an equitable apportionment. See *Kansas* v. *Colorado*, 206 U.S. 46, 114-117 (1907); *Colorado* v. *Kansas*, 320 U.S. 383, 391-392 (1943).

In the first suit, Kansas sought to enjoin water diversions in Colorado, but the Court denied relief on the ground that Colorado's depletions of the Arkansas River were insufficient at that time to warrant injunctive relief. *Kansas* v. *Colorado*, 206 U.S. at 114-117. In the second suit, Colorado sought to enjoin lower court litigation brought by Kansas water users against Colorado water users, while Kansas sought an equitable apportionment of the Arkansas River. The Court concluded that Colorado was entitled to the injunction it sought, but the Court concluded once again that Kansas had failed to show sufficient injury to warrant an equitable apportionment of the Arkansas River. *Colorado* v. *Kansas*, 320 U.S. at 391-392; see *Kansas* v. *Colorado*, 514 U.S. at 678.

In denying Kansas's second request for judicial relief, the Court suggested that a dispute such as the one between Kansas and Colorado calls for "expert administration rather than judicial imposition of a hard and fast rule," and that the controversy "may appropriately be composed by negotiation and agreement, pursuant to the compact clause of the federal Constitution." *Colorado* v. *Kansas*, 320 U.S. at 392. Shortly thereafter, the States approved, and Congress ratified, the Arkansas River Compact, Act of May 31, 1949, ch. 155, 63 Stat. 145. The Compact was intended to "[s]ettle existing disputes and remove causes of future controversy" between the States and their citizens over

the use of the Arkansas River. To that end, the Compact was designed to

> [e]quitably divide and apportion between the States of Colorado and Kansas the waters of the Arkansas River and their utilization as well as the benefits arising from the construction, operation and maintenance by the United States of John Martin Reservoir Project for water conservation purposes.

Compact Art. I, 63 Stat. 145. The Compact accomplishes those goals through two basic mechanisms.

First, the Compact protects the States' respective rights to continued use of the Arkansas River through a limitation on new depletions. Article IV-D of the Compact allows new development in the form of dams, reservoirs, and other water-utilization works in Colorado and Kansas, provided that the "waters of the Arkansas River" are not thereby "materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact." 63 Stat. 147. The Compact defines the term "waters of the Arkansas River," Art. III-B, 63 Stat. 146, but it does not expressly define what constitutes a "material" depletion or a "usable" quantity.[1]

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[1] The full text of Article IV-D states as follows:

> This Compact is not intended to impede or prevent future beneficial development of the Arkansas River basin in Colorado and Kansas by Federal or State agencies, by private enterprise, or by combinations thereof, which may involve construction of dams, reservoir, and other works for the purposes of water utilization and control, as well as the improved or prolonged functioning of existing works: Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability

Second, the Compact regulates the storage of water at John Martin Reservoir and specifies the criteria under which each State is entitled to call for water releases. Article V of the Compact, which provides the "basis of apportionment of the waters of the Arkansas River," prescribes the timing of storage at the reservoir and the release criteria. 63 Stat. 147-149. Basically, between November 1 and March 31, in-flows to the John Martin Reservoir are stored, subject to Colorado's right to demand a limited amount of water. Between April 1 and October 31, the storage of water is largely curtailed, and either State may call for releases at any time in accordance with the flow rates set out in the Compact. *Ibid.*

The Compact creates an interstate agency, the Arkansas River Compact Administration, to administer the Compact. Art. VIII, 63 Stat. 149-151. The Compact Administration consists of a non-voting presiding officer designated by the President of the United States and three voting representatives from each State. It is empowered to adopt by-laws, rules, and regulations, prescribe procedures for the administration of the Compact, and perform functions to implement the Compact. See Arts. VIII-B, VIII-C, 63 Stat. 149, 150. Article VIII-H of the Compact directs that the Administration shall "promptly investigate[]" violations of the Compact and report its findings and recommendations to the appropriate state official. 63 Stat. 151. That Article further states that it is "the intent of this Compact that enforcement of its terms shall be accomplished in

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for use to the water users in Colorado and Kansas under this Compact by such future development or construction.

63 Stat. 147.

general through the State agencies and officials charged with the administration of water rights." *Ibid.*

3. The Current Proceedings

Kansas brought this action in 1985 to enforce the provisions of the Arkansas River Compact. Special Master Littleworth filed his initial report with the Court in July 1994 addressing issues of liability. He recommended that the Court find that post-Compact well pumping in Colorado had violated Article IV-D of the Compact and that Colorado be held liable for that violation. The Master also recommended that the Court find no violation of the Compact with respect to Kansas's claims arising from the operation of the Trinidad Reservoir and the Winter Water Storage Program that utilizes excess storage capacity at the Pueblo Reservoir. The Court adopted all of the Master's recommendations and remanded for determination of the unresolved issues—primarily relating to what remedy, if any, Kansas was entitled to as a result of Colorado's breach—in a manner not inconsistent with the Court's opinion. *Kansas* v. *Colorado*, 514 U.S. at 694.

On remand, the Master conducted further proceedings and issued a Second Report providing his preliminary recommendations on the issues of: (a) quantifying the depletions in flows of the Arkansas River at the Colorado-Kansas border (stateline flows) for the period 1950-1985; (b) quantifying depletions for the period subsequent to 1985; (c) bringing Colorado into current compliance with the provision of the Compact; and (d) a remedy for past depletions. See Second Report 2, 112. The Court invited the parties to file exceptions to the recommendations contained in the Master's Second Report. See 522 U.S. 803 (1997). Kansas and the United

States did not file any exceptions. Colorado challenged the Master's conclusions that (1) if the remedy includes money damages, the Eleventh Amendment of the United States Constitution does not bar an award of money damages based, in part, on losses incurred by Kansas's water users; and 2) the unliquidated nature of Kansas's claim for damages does not, in and of itself, bar the award of prejudgment interest. The Court overruled Colorado's exceptions without prejudice to Colorado's right to renew those exceptions at the conclusion of the remedy phase of the case. 522 U.S. 1073 (1998).

After conducting further proceedings, including a trial on the appropriate remedy for Colorado's violations of the Compact, the Master issued his Third Report, dated August 2000, containing his recommended remedy. The Master's Third Report recommends, in essence, that:

(1) depletions of usable stateline flow for the 1995-1996 period be determined to be 7935 acre-feet, bringing the total depletions for 1950-1996 to 428,005 acre-feet;

(2) the Court confirm the Master's determination that if a suitable remedy includes money damages, those damages should be based upon Kansas's loss rather than upon any gain to Colorado;

(3) the Court confirm the Master's conclusion that if a remedy includes money damages, the Eleventh Amendment does not preclude damages awarded to Kansas from being based, in part, upon losses incurred by its water users;

(4) the Court confirm the Master's ruling that the unliquidated nature of Kansas's claim for damages does not bar the award of prejudgment interest;

(5) the remedy be money damages, rather than repayment of the historical shortage by additional water deliveries in the future;

(6) the amount of Kansas's damages be determined on the basis of the analyses used by Kansas's experts;

(7) the categories of Kansas's damages be calculated as provided in the Third Report;

(8) Kansas's damages include prejudgment interest as provided in Section XI of the Third Report;

(9) the Master's March 22, 2000, order regarding mitigation of damages be confirmed; and

(10) the Master's May 1, 2000, order regarding Colorado's objection to expert testimony on secondary economic damages be confirmed.

Third Report 119-120.

As relevant here, the core of the Master's recommendation is that money damages be awarded to Kansas for water losses beginning in 1950, with prejudgment interest awarded for the period from 1969 to the present. Kansas has filed an exception to the Master's determination that prejudgment interest should be awarded only from 1969 forward. Colorado has filed a number of exceptions, including a renewal of its exceptions to include the losses of Kansas's water users in the calculation of damages, and to any award of prejudgment interest.

INTRODUCTION AND SUMMARY OF ARGUMENT

The State of Kansas brought this action to enforce its rights under the Arkansas River Compact, which apportions the flow of the Arkansas River between Kansas and Colorado. This Court resolved the issues of liability in its earlier decision in *Kansas* v. *Colorado*, 514 U.S. 673 (1995), which accepted the Master's recommendation that Colorado be held liable for violations of Article IV-D of the Compact resulting from post-Compact well pumping in Colorado. On remand, the Master heard evidence and prepared a thorough report addressing a number of issues, including what potential remedies might be available for Colorado's breach. The Court overruled Colorado's exceptions to that report without prejudice and remanded the case to the Master for further proceedings. 522 U.S. 1073 (1998). Following resolution of a number of other issues related to Compact compliance and modeling, the Master conducted a trial on the appropriate remedy for Colorado's past violations of the Compact. Following that trial, the Master submitted his Third Report documenting his ultimate recommendations with respect to the appropriate remedy for Colorado's violations of the Compact.

The Master recommended that Kansas be awarded money damages for all losses that have occurred as a result of Compact violations, including the aggregate losses to past and future Kansas water users, and that prejudgment interest be awarded on damages from 1969 to the present. The Master's proposed remedy raises two questions of first impression in this Court: (1) how to calculate an award of money damages against a State as a remedy for a violation of a compact apportioning the waters of an interstate river; and (2)

the availability of prejudgment interest on such an award. The United States submits that, under the circumstances of this case, the Master's recommended remedy falls within the Court's broad discretion to fashion a fair and equitable remedy for Colorado's violation of the Arkansas River Compact.

I. Colorado contends that the Eleventh Amendment bars an award of money damages that is calculated, in part, based on injuries to individual water users in Kansas that resulted from groundwater pumping in Colorado. Under this Court's cases, however, the Eleventh Amendment bars a suit by a State only if it is appearing as a nominal party for purposes of advancing the private claims of individual citizens of the State against another State. Here, Kansas sued to protect its sovereign interests as a party to an interstate compact and its quasi-sovereign interests in the health and economic well-being of its citizens. This Court held in *Texas* v. *New Mexico*, 482 U.S. 124, 130-132 & n.7 (1987), that an award of money damages can be an appropriate remedy in such a case and is not barred by the Eleventh Amendment. Nothing in the Eleventh Amendment bars the Court from calculating the amount of those damages by reference to the injuries sustained by the individual water users who comprise the general population that Kansas has a legitimate quasi-sovereign interest in protecting.

II. The Master recommends that prejudgment interest be awarded for the period from 1968 to the present. Colorado objects to that award, urging the Court to adopt a categorical rule barring an award of prejudgment interest for violation of an interstate compact apportioning the flows of an interstate river. Colorado relies on the traditional rule at common law that prejudgment interest is not owed where damages

are unliquidated. In cases within its original jurisdiction, however, the Court has broad discretion to fashion appropriate principles of decision, and it has not been bound by statutory or common law rules that may be applicable in other settings. Here, the Master identified sound reasons for not adopting the categorical rule that Colorado proposes. In the first place, the common rule was never absolute, and it is no longer followed in a number of jurisdictions. Moreover, this Court has repeatedly observed that the distinction between liquidated and unliquidated damages for these purposes is inconsistent with the goal of affording adequate compensation, and that a strict rule barring prejudgment interest where damages are unliquidated has been subject to substantial criticism for that reason. We therefore support the Master's recommendation that the common law rule generally barring an award of prejudgment interest on unliquidated damages not be imported into the jurisprudence of suits between States within this Court's original jurisdiction.

After rejecting a categorical rule barring the award of prejudgment interest, the Master carefully evaluated all of the circumstances of the case and the respective equities of the two States that bear on the appropriateness of an award of prejudgment interest, and concluded that such an award is proper but only from 1968 forward. Kansas has filed an objection, contending that prejudgment interest should be awarded all the way back to 1950. Colorado, on the other hand, contends that if prejudgment interest is not altogether foreclosed, it should be awarded only beginning in 1985, when Kansas first filed a formal complaint concerning the groundwater pumping. In our view, however, the Master reasonably balanced the relevant factors in awarding prejudgment interest beginning in 1969,

when, the Master found, Colorado first knew or should have known that groundwater pumping in that State was depleting stateline flows of the Arkansas River.

ARGUMENT

I. THE CALCULATION OF DAMAGES FOR INJURIES TO KANSAS'S QUASI-SOVEREIGN INTEREST IN THE ECONOMIC HEALTH AND WELFARE OF ITS RESIDENTS IN PART ON THE BASIS OF INJURIES SUFFERED BY PAST, PRESENT, AND FUTURE KANSAS WATER USERS DOES NOT VIOLATE THE ELEVENTH AMENDMENT

The Court has previously held, in *Texas* v. *New Mexico*, 482 U.S. 124, 130-132 (1987), that money damages may be awarded against a State as a remedy for its violation of an interstate compact that apportions the flow of a river between two States, and it subsequently entered a stipulated judgment in that case ordering New Mexico to pay $14 million to Texas. See 494 U.S. 111 (1990). See also *Virginia* v. *West Virginia*, 246 U.S. 565 (1918) (enforcement of judgment for money damages for violation of interstate compact to assume debt); *South Dakota* v. *North Carolina*, 192 U.S. 286 (1904) (suit to recover on bonds); *United States* v. *Michigan*, 190 U.S. 379 (1903) (suit to require Michigan to account for surplus moneys from sale of land to fund construction of canal).

Because the parties reached a settlement regarding the amount of damages to be paid in *Texas* v. *New Mexico*, this case presents the first occasion for the Court to determine the appropriate amount of a monetary remedy for a violation of an interstate compact apportioning the flow of an interstate stream. The

Master, in a thorough report detailing his analysis of the applicable law and exploring the potential remedies Kansas may obtain as a result of Colorado's breach of the Compact, recommended a monetary award based, in part, on evidence of the injuries to Kansas's water users as a result of Colorado's breach. Colorado contends that the Eleventh Amendment bars a State, acting in its *parens patriae* capacity, from recovering money damages based on losses to individual water users that occurred as a result of a violation of an interstate compact. See Colo. Excp. Br. 10-25. We disagree.

The Eleventh Amendment provides, in relevant part, that "[t]he Judicial power of the United States shall not be construed to extend to any suit in law or equity, commenced or prosecuted against one of the United States by Citizens of another State." U.S. Const. Amend. XI. The Eleventh Amendment prevents a State from suing another State where it is essentially a nominal party and appears as a "trustee" seeking to enforce only the personal rights or claims of individual citizens who could not themselves sue the defendant State. See *New Hampshire* v. *Louisiana*, 108 U.S. 76 (1883); *North Dakota* v. *Minnesota*, 263 U.S. 365 (1923). The Eleventh Amendment does not, however, bar a suit brought by a State acting as *parens patriae* to its citizens "to prevent or repair harm to its 'quasi-sovereign' interests." *Hawaii* v. *Standard Oil Co.*, 405 U.S. 251, 258 (1972). As the Court stated in *North Dakota*:

> The right of a State as *parens patriae* to bring suit to protect the general comfort, health, or property rights of its inhabitants threatened by the proposed or continued action of another State, by prayer for injunction, is to be differentiated from its lost power as a sovereign to present and enforce individual claims of its citizens as their trustee against a sister State.

263 U.S. at 375-376; see also *Maryland* v. *Louisiana*, 451 U.S. 725, 745 n.21 (1981) ("[A]n original action between two States only violates the Eleventh Amendment if the plaintiff State is actually suing to recover for injuries to specific individuals."); *Hawaii* v. *Standard Oil Co.*, 405 U.S. at 259 n.12 ("An action brought by one State against another violates the Eleventh Amendment if the plaintiff State is actually suing to recover for injuries to designated individuals.").

The *New Hampshire* and *North Dakota* decisions illustrate the circumstances in which a suit by a State is barred by the Eleventh Amendment because the State appears only as a nominal party in presenting personal claims of its citizens, and not as *parens patriae* seeking to protect the general interests of the State and its inhabitants. In *New Hampshire*, citizens of New Hampshire and New York held bonds issued by the State of Louisiana, payment of which was in default. The individual holders assigned the bonds to their respective States, which brought an original action in this Court to recover the amount due on the bonds. The Court concluded that the States' action was barred by the Eleventh Amendment because it was a mere subterfuge for recovery on behalf of the individual bondholders. The States, according to the Court, were "nothing more nor less than * * * mere collecting agent[s] of the owners of the bonds and coupons, and while the suits are in the names of the States, they are under the actual control of individual citizens, and are

prosecuted and carried on altogether by and for them." *New Hampshire*, 108 U.S. at 89.[2]

In *North Dakota*, the Court ruled that the Eleventh Amendment barred North Dakota from bringing a damages claim against Minnesota seeking $1 million "for its inhabitants whose farms were injured and whose crops were lost" as a result of flooding allegedly caused by Minnesota's use of the Mustinka River. 263 U.S. at 374. The Court observed:

> The evidence discloses that nearly all the Dakota farm owners whose crops, lands and property were injured in these floods, contributed to a fund which has been used to aid the preparation and prosecution of this cause. It further appears that each contributor expects to share in the benefit of the decree for damages here sought, in proportion to the amount of his loss. Indeed it is inconceivable that North Dakota is prosecuting this damage feature of its suit without intending to pay over what it thus recovers to those entitled.

Id. at 375. Relying on its decision in *New Hampshire* v. *Louisiana*, the Court ruled that North Dakota was

[2] Among other things, the individual owners were required to fund all costs and expenses of the litigation, and state law required that all moneys collected be kept by the State's attorney general, as special trustee, in a separate account. Those moneys were to be paid over to the owners of the bonds after the litigation costs were deducted. *New Hampshire*, 108 U.S. at 89. In the case of New Hampshire, the individual bondholders also had the right to choose their own counsel to pursue the claims, and their consent was required before the claims could be settled. *Ibid.* Based on those facts, the Court declared that "[n]o one can look at the pleadings and testimony in these cases without being satisfied, beyond all doubt, that they were in legal effect commenced, and are now prosecuted, solely by the owners of the bonds and coupons." *Ibid.*

acting, not as *parens patriae*, but as a trustee, seeking to present and enforce private claims of its individual citizens. *Ibid.* See also *Alfred L. Snapp & Son, Inc.* v. *Puerto Rico*, 458 U.S. 592, 600 (1982) ("if the State is only a nominal party without a real interest of its own—then it will not have standing under the *parens patriae* doctrine").[3]

The rule that emerges from this Court's cases, then, is that while a State is not "permitted to enter a controversy as a nominal party in order to forward the claims of individual citizens," a State may "act as the representative of its citizens in original actions where the injury alleged affects the general population of a State in a substantial way." *Maryland* v. *Louisiana*, 451 U.S. at 737. The interests of a State that may be vindicated in an original action against another State "embrace its '*quasi-sovereign*' interests which are 'independent of and behind the titles of its citizens, in all the earth and air within its domain.'" *Oklahoma ex rel. Johnson* v. *Cook*, 304 U.S. 387, 393 (1938) (quoting *Georgia* v. *Tennessee Copper Co.*, 206 U.S. 230, 237 (1907)). And, as the Court held in *Texas* v. *New*

[3] In *South Dakota* v. *North Carolina*, 192 U.S. 286 (1904), by contrast, a private bond holder donated his bonds outright to the State of South Dakota. The Court observed that there could be no "question respecting the title of South Dakota to these bonds," since "[t]hey [we]re not held by the State as representative of individual owners, * * * for they were given outright and absolutely to the State." *Id.* at 310 (citing and distinguishing *New Hampshire* v. *Louisiana*, *supra*). The Court concluded on that basis that the suit was properly regarded as "an action brought by one State against another to enforce a property right" and was therefore permitted to go forward. *Id.* at 318; see *Oklahoma ex rel. Johnson* v. *Cook*, 304 U.S. 387, 392-393 (1938) (discussing *New Hampshire* and *South Dakota*).

Mexico, the Court may properly award money damages as a remedy for injury to those interests. See 482 U.S. at 130, 132 n.7.

The Court, in accepting this case as a proper exercise of its original jurisdiction, determined that Kansas had appropriately commenced the current action to protect its sovereign and quasi-sovereign interests under the Arkansas River Compact, and was not acting simply as a trustee for individual Kansas citizens. Indeed, in *Oklahoma ex rel. Johnson* v. *Cook*, *supra*, this Court specifically pointed to Kansas's prior suit against Colorado to prevent diversions of water from the Arkansas River as an example of a proper suit to protect a State's "*quasi-sovereign*" interests. See 304 U.S. at 393-394 (citing *Kansas* v. *Colorado*, 206 U.S. at 95, 96.). And in this case, unlike in its earlier suit against Colorado, Kansas's suit also advances its sovereign interests as a formal party to an interstate compact with Colorado. See *Alfred L. Snapp & Son, Inc.*, 458 U.S. at 601.

The Master concluded, and Colorado does not dispute, that Kansas is seeking recovery for injuries to its legitimate quasi-sovereign interest in the general economic well-being and property of its citizens, interests which are "independent of and behind the titles of its citizens." *Georgia* v. *Tennessee Copper Co.*, 206 U.S. at 237. Accordingly, Colorado's Eleventh Amendment challenge does not question whether Kansas is properly acting as *parens patriae* in bringing this suit; rather, Colorado asserts that the Eleventh Amendment bars a State properly acting as *parens patriae* from being awarded damages that are based, in part, on the aggregate losses suffered by the State's residents. The applicability of the Eleventh Amendment, however, depends on the nature and origin of the

claim, and not on the measure of damages in an otherwise proper monetary award. If the Court determines that a complaint presents a proper action by a State to protect its sovereign and quasi-sovereign interest in the general health and welfare of its residents, the calculation of the amount of money damages to be paid as a remedy for the injury to the general population of the State cannot convert a proper action between two States into an impermissible action by citizens of one State against another State in violation of the Eleventh Amendment.

The Master found that a large area of southwestern Kansas (almost 800,000 acres) suffered from Colorado's violations of the Compact, that the groundwater resources of Kansas have been permanently damaged, and that increased costs and lost farm income in the region have caused secondary economic impacts throughout the State. Third Report 12. The Master, defining the injuries to the general economic well-being of Kansas's residents as including the regional increases in farm costs and reduced crop yields, recommended a damages remedy consisting of the sum of 1) the additional pumping costs required to replace depletions of usable stateline flow from the Arkansas River; 2) the historic and projected future cost increases due to the permanent damage to groundwater resources; 3) the historic crop production losses due to surface water depletions; 4) the historic and projected future secondary economic damages to the State as a whole; and 5) the state income taxes that would have been paid on increased farm income absent depletions. *Id.* at 17-86. The recommended damages award was reduced by the amount of federal income taxes that would have been paid on the lost farm net income due to depletions. *Id.* at 35-36.

Colorado argues that the inclusion of the aggregate of individual damages in the recommended monetary award allows the State to "recover damages for the benefit of individuals" in violation of the Eleventh Amendment. Colo. Excp. Br. 19. Colorado misconstrues the Master's reference to injuries sustained by farmers in calculating the recommended monetary award to Kansas. The Master did not recommend that a money damages award include a recovery for any personal claims individual farmers may have in their own right based on upstream diversions of water, with the proceeds to be paid directly to those farmers. If Kansas were appearing only as a nominal party in presenting such private claims, those claims would be essentially the same as those the Court found to be barred in *North Dakota* v. *Minnesota*, *supra*.

Rather, Kansas is advancing a claim of its own, in its sovereign and quasi-sovereign capacities, that is based on Colorado's alleged violation of the Compact and is distinct from any personal claims of individual Kansas citizens. After this Court held that Colorado had violated the Compact, the Master determined that damages should be paid to Kansas based on the injury to Kansas's quasi-sovereign interest in the economic health and welfare of its residents. The Master calculated those damages as the sum of the damages for injuries to Kansas's residents, including the direct injuries suffered by water users—past, present, and future—in the southwestern region of Kansas as a result of Colorado's violation.

The Eleventh Amendment does not bar a State from recovering full compensation for injuries to its quasi-sovereign interest in the economic health and welfare of its residents. In this case, the Master calculated those injuries to Kansas, in part, by aggregating the direct

injuries suffered by past, present, and future water users in the State. The Master's recommended award is consistent with the Court's broad discretion in formulating a fair and equitable remedy in cases under the Court's original jurisdiction and does not violate the Eleventh Amendment. See *Texas* v. *New Mexico*, 482 U.S. at 130 (the Constitution entrusts the Court with sufficient judicial power to "order[] a suitable remedy, whether in water or money," and "the Eleventh Amendment is no barrier, for by its terms, it applies only to suits by citizens against a State"). Colorado's exception to the Master's Third Report based on the Eleventh Amendment should be overruled.[4]

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[4] There is no requirement in the Master's remedy here, just as there was not in *Texas* v. *New Mexico* (see 482 U.S. at 131-132 & n.7), that any money awarded to Kansas be paid over to individual farmers who were injured by upstream diversions in Colorado.

The United States and its agencies and officers are authorized to bring suits for violations of federal statutes under which private individuals are also authorized to sue, and the relief ordered in the government's suit includes the payment of monetary relief to individual victims. In such a suit, the federal government is advancing its interests, distinct from those of the individuals who may have personal claims, in enforcing its own laws. See, *e.g.*, *General Tel. Co.* v. *EEOC*, 446 U.S. 318, 326 (1980) ("When the EEOC acts, albeit at the behest of and for the benefit of specific individuals, it acts also to vindicate the public interest in preventing employment discrimination."). The Court made clear in *Alden* v. *Maine*, 527 U.S. 706 (1999), that the Eleventh Amendment is no bar to such a suit by the federal government against a State. See *id.* at 759 (discussing 29 U.S.C. 216(c), which allows suits by the Secretary of Labor to compel the payment of unpaid compensation owed under the Fair Labor Standards Act). See 527 U.S. at 755 ("In ratifying the Constitution, the States consented to suits brought by other States or by the Federal Government."); *West Virginia* v. *United States*, 479 U.S. 305, 311 (1987) ("States have no sovereign immunity as against the Federal Government.").

II. IT IS WITHIN THE COURT'S SOUND DISCRETION TO AWARD PREJUDGMENT INTEREST IN AN ORIGINAL ACTION

In his Third Report, the Master determined that Kansas was injured as a result of Colorado's depletion of an aggregate of 428,005 acre-feet of usable stateline flows over the years from 1950 to 1996. Third Report 1, 8-9, 12, 120. The Master recommended an award of money damages to Kansas to compensate for those injuries. The Master further recommended that prejudgment interest be granted on the damages from 1969 to the time of judgment. The Master determined, however, that, because from 1950 to 1968 neither Kansas nor Colorado was aware that material depletions of the Arkansas River's usable stateline flows were occurring, the damages for that period should be adjusted for inflation but should not include an interest rate adjustment for the lost time value of money.

Kansas has filed an exception to the Master's denial of prejudgment interest for the period from 1950 to 1968. Colorado has filed an exception to the award of any prejudgment interest. Colorado asserts that due to the complexity of determining depletions to usable stateline flows and the fact that there is no time limitation on actions for violation of an interstate compact, the Court should apply the common law rule, which generally barred an award of prejudgment interest on unliquidated claims, absent bad faith or other exceptional circumstance. Colo. Excp. Br. 28. In the alternative, Colorado contends that if prejudgment interest is awarded, interest should begin to run only

from 1985, when Kansas first made a formal complaint.[5] *Id.* at 37.

The Court has never directly addressed the issue of prejudgment interest in the context of interstate original actions. The United States' liability for interest in original actions, like its liability in other cases, is governed by the usual principles respecting federal sovereign immunity.[6] The liability of the individual States, however, remains an open question.

Prejudgment interest is intended to compensate injured parties for both the time value of lost money and the effects of inflation. "[P]rejudgment interest is not awarded as a penalty; it is merely an element of just compensation." *City of Milwaukee* v. *Cement Division, National Gypsum Co.*, 515 U.S. 189, 197 (1995). Nonetheless, under the traditional common law approach, "prejudgment interest could not be awarded where damages were unliquidated, absent bad faith or other exceptional circumstances." See, *e.g.*, *General Motors Corp.* v. *Devex Corp.*, 461 U.S. 648, 653 (1983); see *Duplate Corp.* v. *Triplex Safety Glass Co.*, 298 U.S. 448 (1936); *Tilghman* v. *Proctor*, 125 U.S. 136 (1888). We do not believe, however, that the common law approach supports Colorado's contention that this Court should

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[5] The Master noted that Colorado agreed that a "fair and equitable remedy" would adjust all damages for inflation. Third Report 107. Colorado appears to be challenging only the award of an adjustment to the damages for the lost time value of money.

[6] This Court has held that "in the absence of constitutional requirements, interest can be recovered against the United States only if express consent to such a recovery has been given by Congress." *United States* v. *New York Rayon Importing Co.*, 329 U.S. 654, 658-659 (1947). See also *Library of Congress* v. *Shaw*, 478 U.S. 310 (1986).

adopt a categorical rule prohibiting prejudgment interest in original actions between States.

In the first place, the common law rule itself was not absolute; prejudgment interest was allowed in instances of "bad faith or other exceptional circumstances." *General Motors*, 461 U.S. at 653. Moreover, courts have not always felt bound to follow even that formulation. In fact, it appears that a majority of jurisdictions have now rejected the traditional, restrictive approach to awarding prejudgment interest. See Third Report 94; *id.* App. Exh. 4. This Court, too, has repeatedly noted that the distinction between liquidated and unliquidated damages for these purposes is questionable, and that the rule against prejudgment interest is inconsistent with the goal of full compensation. Indeed, more than 65 years ago, in *Funkhouser* v. *J.B. Preston Co.*, 290 U.S. 163 (1933), the Court stated:

> It has been recognized that a distinction, in this respect, simply as between cases of liquidated and unliquidated damages, is not a sound one. Whether the case is of the one class or the other, the injured party has suffered a loss which may be regarded as not fully compensated if he is confined to the amount found to be recoverable as of the time of breach and nothing is added for the delay in obtaining the award of damages. Because of this fact, the rule with respect to unliquidated claims has been in evolution, * * * and in the absence of legislation the courts have dealt with the question of allowing interest according to their conception of the demands of justice and practicality.

Id. at 168-169. See *City of Milwaukee*, 515 U.S. at 197 ("[T]he liquidated/unliquidated distinction has faced

trenchant criticism for a number of years."); *General Motors Corp.*, 461 U.S. at 655-656.

In admiralty, where this Court has traditionally felt free to fashion rules suited to the particular exigencies in that area, the common law rule has not governed. Instead, in suits in admiralty, prejudgment interest historically has been recoverable except in "peculiar" or "exceptional" circumstances. See *City of Milwaukee*, 515 U.S. at 195 (collecting cases).[7] We think the Court similarly should not import the common law rule into the jurisprudence of suits between States, especially given the criticism of that rule in other settings. This Court has broad discretion in cases within its original jurisdiction and is not bound by statutory or common law rules developed in other contexts. For example, in *Texas* v. *New Mexico*, the Court rejected New Mexico's contention that it was precluded from awarding post-judgment interest in the absence of any statute authorizing such interest. 482 U.S. at 133 n.8. New Mexico had relied in part on the Court's opinion in *Pierce* v. *United States*, 255 U.S. 398, 406 (1921), which, after noting the common law rule that judgments do not bear interest, held that post-judgment interest may not be awarded in the absence of statutory authority. Emphasizing its broad discretion in original jurisdiction cases, the Court declared that "we are not bound by this rule in exercising our original jurisdiction." 482 U.S. at 133 n.8. What was true of the common law rule respecting *post*-judgment interest in *Texas* v. *New*

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[7] We note as well the general rule that prejudgment interest is due on debts owed to the federal government, including debts owed by state and local governments. See, *e.g.*, *United States* v. *Texas*, 507 U.S. 529, 533-534 (1993); *Board of County Comm'rs* v. *United States*, 308 U.S. 343, 350-353 (1939).

Mexico is true of the common law rule respecting *pre*judgment interest here.

Based on his review of the applicable law, the Master concluded that the unliquidated nature of Kansas's money damages should not, in and of itself, bar an award of prejudgment interest. Third Report App. 43. We agree. Because prejudgment interest is awarded not as a penalty, but as an element of compensation, application of the traditional common law rule could result in substantial unfairness to a State that was unquestionably injured by a violation of an interstate compact, if the amount of the damages was not readily ascertainable prior to judgment. A strict rule against the award of prejudgment interest in such cases could also result in an unjustified windfall for the offending State and undermine a potentially important incentive for States to comply with the requirements of an interstate compact.

After rejecting Colorado's argument for a categorical rule barring an award of prejudgment interest, the Master proceeded to determine if "considerations of fairness," *Board of County Comm'rs* v. *United States*, 308 U.S. at 352, suggested that the Court should exercise its discretion to award prejudgment interest under the circumstances of this case. Following a careful analysis of all of the equities regarding an award of prejudgment interest, the Master was convinced that "prejudgment interest adjusting for inflation and for the loss of use of funds owed should be included in any damage award for violation of an interstate water compact." Third Report 102.

The Master concluded, however, that an award of prejudgment interest for the entire period of the violation in this case would not be fair and just. He relied principally on the lack of knowledge by both parties in

the early years about pumping in Colorado and its impacts along the Arkansas River, as well as the difficulty of determining the impact of groundwater pumping on usable stateline flows. Third Report 106 ("Neither state in the early years saw any wrongdoing, or thought that Kansas was not receiving its compact share of usable flows of the Arkansas River."); *ibid.* (Depletions during this period were discovered only "with hindsight and the benefit of sophisticated computer modeling."). Based on his finding that by 1968 Colorado knew, or should have known, that post-compact wells were causing material depletions of usable stateline flows, the Master recommended that Kansas be awarded actual damages for the period from 1950 to 1968, adjusted for inflation only. For the period from 1969 to the date of judgment, the Master recommended that Kansas be awarded prejudgment interest. *Id.* at 103, 106.

The Master's recommendation concerning an award of prejudgment interest is based on a thorough evaluation of the relevant considerations of fairness and justice. The nature of this Court's original jurisdiction and its broad discretion in formulating fair and equitable remedies in such cases, see *Texas* v. *New Mexico*, 482 U.S. at 130, permits the Court to fashion an appropriate remedy, including an award of prejudgment interest. The United States believes that the Master has provided a sound basis for an award of prejudgment interest that reasonably balances the equities of each State.

CONCLUSION

The exceptions of Colorado and Kansas to the award of prejudgment interest and the exception of Colorado to the calculation of the amount of damages due based on the Eleventh Amendment should be overruled.

Respectfully submitted.

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In The

Supreme Court of the United States

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

UNITED STATES OF AMERICA,

Defendant-Intervenor.

On Exceptions To The Report Of The Special Master

COLORADO'S REPLY BRIEF IN OPPOSITION TO KANSAS' EXCEPTION TO THE THIRD REPORT OF THE SPECIAL MASTER

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QUESTIONS PRESENTED

1. Is there a "general rule" that prejudgment interest should be awarded on damages for violation of an interstate water compact, absent some exceptional circumstance?

2. Should prejudgment interest be awarded on damages for violation of the Arkansas River Compact before Colorado knew, or should have known, that post-Compact well pumping in Colorado was depleting usable Stateline flows in violation of the Compact?

3. Are the circumstances identified by the Special Master appropriate reasons for denying prejudgment interest?

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COLORADO'S REPLY BRIEF IN OPPOSITION TO KANSAS' EXCEPTION TO THE THIRD REPORT OF THE SPECIAL MASTER

PROVISIONS OF THE ARKANSAS RIVER COMPACT INVOLVED

The Kansas exception to the Third Report of the Special Master involves the following provisions of the Arkansas River Compact, 63 Stat. 145 (1949):

ARTICLE I

The major purposes of this Compact are to:

A. Settle existing disputes and remove causes of future controversy between the States of Colorado and Kansas, and between citizens of one and citizens of the other State, concerning the waters of the Arkansas River and their control, conservation and utilization for irrigation and other beneficial purposes.

B. Equitably divide and apportion between the States of Colorado and Kansas the waters of the Arkansas River and their utilization as well as the benefits arising from the construction, operation and maintenance by the United States of John Martin Reservoir Project for water conservation purposes.

ARTICLE IV

* * *

D. This Compact is not intended to impede or prevent future beneficial development of the Arkansas River basin in Colorado and Kansas by Federal or State agencies, by

private enterprise, or by combinations thereof, which may involve construction of dams, reservoir,[1] and other works for the purposes of water utilization and control, as well as the improved or prolonged functioning of existing works: Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction.

* * *

ARTICLE VII

A. Each State shall be subject to the terms of this Compact. Where the name of the State or the term "State" is used in this Compact these shall be construed to include any person or entity of any nature whatsoever using, claiming or in any manner asserting any right to the use of the waters of the Arkansas River under the authority of that State.

* * *

ARTICLE VIII

A. To administer the provisions of this Compact there is hereby created an interstate

[1] Article IV-D of the Compact as printed in 63 Stat. 145 contains a typographical error. The Compact as signed by the Commissioners said "reservoirs."

agency to be known as the Arkansas River Compact Administration herein designated as "the Administration".

* * *

C. The membership of the Administration shall consist of three representatives from each State who shall be appointed by the respective Governors for a term not to exceed four years. One Colorado representative shall be a resident of and water right owner in Water Districts 14 or 17, one Colorado representative shall be a resident of and water right owner in Water District 67, and one Colorado representative shall be the Director of the Colorado Water Conservation Board. Two Kansas representatives shall be residents of and water right owners in the counties of Finney, Kearny or Hamilton, and one Kansas representative shall be the chief State official charged with the administration of water rights in Kansas. The President of the United States is hereby requested to designate a representative of the United States, and if a representative is so designated he shall be an ex-officio member and act as chairman of the Administration without vote.

* * *

H. Violation of any of the provisions of this Compact or other actions prejudicial thereto which come to the attention of the Administration shall be promptly investigated by it. When deemed advisable as the result of such investigation, the Administration may report its findings and recommendations to the State official who is charged with the administration of water rights for appropriate action, it being the intent

of this Compact that enforcement of its terms shall be accomplished in general through the State agencies and officials charged with the administration of water rights.

INTRODUCTION AND SUMMARY OF ARGUMENT

The State of Kansas brought this action to enforce its rights under the Arkansas River Compact, which apportions the waters of the Arkansas River between Colorado and Kansas. In an earlier decision, *Kansas v. Colorado*, 514 U.S. 673 (1995), the Court accepted the Special Master's finding that post-Compact well pumping in Colorado had caused material depletions of usable Stateline flows of the Arkansas River in violation of the Compact and remanded the case to the Master for determination of unresolved issues in a manner not inconsistent with its opinion. *Id.* at 693-94.

In his Third Report, the Master recommends that a remedy for past depletions to usable Stateline flows should be in money damages rather than repayment in water. Third Report at 11, 119. He recommends that money damages awarded to Kansas should include all losses that have occurred as a result of Compact violations, including losses suffered by individual water users in Kansas, and that prejudgment interest should be awarded at the rates proposed by Kansas on damages from 1969 to the date of judgment. *Id.* at 12-13, 64, 107, 119-20.

Kansas has taken exception to the Master's recommendation that prejudgment interest be denied on losses

that occurred before 1969. Kansas contends that the Master correctly recognized a "general rule" that prejudgment interest should be awarded in a case such as this one, absent some exceptional circumstance. Brief in Support of Kansas' Exception to the Third Report of the Special Master ("Kansas Brief") at 10, 12-13. Kansas argues that prejudgment interest is an element of just compensation, not a penalty, and that only very limited circumstances would justify a denial of prejudgment interest, such as where a plaintiff has been guilty of undue delay in bringing suit. *Id.* at 11, 13-18. Kansas states that this Court has previously ruled that Kansas was not guilty of undue delay in prosecuting this lawsuit and argues that none of the reasons offered by the Master for his recommendation justifies withholding prejudgment interest. *Id.* at 10-11, 18-26. Finally, Kansas argues that Colorado is strictly liable under the terms of the Compact for a violation of the Compact by its water users, regardless of whether it knew, or should have known, that post-Compact well pumping was violating the Compact. *Id.* at 26-27.

There is no "general rule" that prejudgment interest should be awarded in a case for breach of an interstate water compact. This Court did not hold that damages could be awarded as a remedy for the breach of an interstate water compact until *Texas v. New Mexico*, 482 U.S. 124 (1987), and that case did not address whether prejudgment interest should be awarded. The common-law rule is that prejudgment interest is not awarded on damages for breach of contract unless the claim is liquidated. None of the circumstances in this case justifies a deviation from the common-law rule. However, even if

an award of prejudgment interest is discretionary in this case, an award of prejudgment interest would not be justified before Colorado knew, or should have known, that post-Compact well pumping in Colorado was depleting usable Stateline flows in violation of the Compact. Further, the difficulty of determining depletions to usable Stateline flows caused by post-Compact well pumping was appropriately considered by the Master as a reason for denying prejudgment interest.

Finally, neither *Texas v. New Mexico* nor the express terms of the Arkansas River Compact suggest that Colorado is strictly liable for a violation of the Compact, regardless of whether Colorado knew, or had reason to know, that post-Compact well pumping was violating the Compact. Moreover, an award of damages to Kansas based on losses suffered by individual water users is not compensatory, and an award of prejudgment interest should not result in overcompensating Kansas.

I. THERE IS NO GENERAL RULE THAT PREJUDGMENT INTEREST SHOULD BE AWARDED IN A CASE SUCH AS THIS

Kansas contends that "[t]he Special Master correctly recognized the general rule that prejudgment interest should be awarded in a case such as this one, absent some exceptional circumstance." Kansas Brief at 10. In fact, there is no "general rule" that prejudgment interest should be awarded in a case such as this. This Court did not hold that money damages could be awarded as a remedy for breach of an interstate water compact until *Texas v. New Mexico*, 482 U.S. 124 (1987). Despite the

implication of the Kansas argument, the Court did not address whether prejudgment interest should be awarded if a monetary remedy were recommended in that case. As the Master stated, "there is no case in which prejudgment interest has been awarded that is at all similar to the facts in this dispute." Third Report at 98. The Master pointed out the uniqueness of this case in his Second Report:

> In this case at hand, depletions of usable Stateline flows in violation of the compact reach back to 1950, and Kansas seeks relief, preferably in money damages, for the total amount of the shortfall since 1950. The Court has already ruled that Kansas was not guilty of laches in bringing this action, but nonetheless Kansas did not seek to file its complaint until the end of 1985. The parties then took almost five years in preparing for trial which began in September of 1990. Whether any of the circumstances and developments that have occurred since 1950 may be considered in assessing the appropriateness of prejudgment interest should be a matter of argument and proof in future proceedings of the remedies phase of this case. Much like [*Board of Comm'rs of*] *Jackson County v. United States* [308 U.S. 343 (1939)], we are without "roots in history" in approaching the issue of damages and prejudgment interest in a case of this kind. 308 U.S. at 351, *supra*.

App. to Third Report at 44.

Moreover, the Court's cases that are cited as the basis for the presumption in favor of prejudgment interest are much more limited than Kansas recognizes. *City of Milwaukee v. Cement Div., National Gypsum Co.*, 515 U.S. 189 (1995), the principal case relied on by Kansas, was an

admiralty case, where decrees have historically included prejudgment interest. *Id.* at 194-96. In addition, it was a case for negligence, in which the City of Milwaukee had negligently breached its duty as a wharfinger. *Id.* at 191. In other words, the City knew, or should have known, that its actions involved an unreasonable risk of causing injury. *Cement Div., National Gypsum Co. v. City of Milwaukee*, 915 F.2d 1154, 1157-58 (7th Cir. 1990) (summarizing the district court's findings that the City was negligent and at fault); Restatement (Second) of Torts § 284 (1965); *see also Myron v. Chicoine*, 678 F.2d 727, 733 (7th Cir. 1982) (an award of prejudgment interest is particularly appropriate in cases involving investment fraud).

West Virginia v. United States, 479 U.S. 305 (1987), cited by Kansas as recognizing the compensatory nature of prejudgment interest in contract cases, was a suit by the United States against the State of West Virginia for breach of a contract to pay money. In that case, West Virginia had asked the U.S. Army Corps of Engineers (Corps) to prepare sites for mobile homes to assist victims displaced by disasters. *Id.* at 307. The mobile homes were provided by the Federal Government pursuant to the Disaster Relief Act of 1970, but the Act specifically required the State or local government to provide the sites, without charge to the United States. *Id.* West Virginia found itself unable to provide the sites and asked the Corps to prepare them. *Id.* The Corps agreed and billed West Virginia for its services, which the State then failed to pay. *Id.*

The United States brought suit seeking to recover $4.2 million for site preparation services plus prejudgment interest. *Id.* West Virginia denied liability for the debt, claiming that the State official who had entered into the agreement had acted without authority. *Id.* The District Court rejected the claim and found the State contractually obligated, but concluded that the State should not be liable for prejudgment interest based on an analysis of the policies underlying the Disaster Relief Act. *Id.* at 308. The Fourth Circuit Court of Appeals reversed the denial of prejudgment interest, holding that prejudgment interest was allowable as a matter of right in a breach-of-contract action where the amount due was liquidated, ascertained, or agreed to. *Id.*

This Court then held that the rule governing the interest to be recovered as damages for delayed payment of a contractual obligation to the United States was a matter of federal law and should be governed by a uniform national rule. *Id.* at 308-09. The Court recognized that under *Board of Comm'rs of Jackson County v. United States*, 308 U.S. 343 (1939), interest "could not simply be required with respect to all claims by the United States against a State or its political subdivision." 479 U.S. at 309. The Court held, however, that under the circumstances there was no policy to compel deviation from the longstanding rule that parties owing debts to the Federal Government must pay prejudgment interest where the underlying claim is a contractual obligation to pay money. *Id.* at 310. The Court noted that prejudgment interest is an element of complete compensation and that this federal interest in complete compensation was likely to be present "in any *ordinary commercial contractual*

arrangement between a State and the Federal Government." *Id.* at 310-11 (emphasis added). *See also United States v. Texas*, 507 U.S. 511, 538 (1993) (Debt Collection Act did not abrogate the United States' federal common law right to collect prejudgment interest on debts owed to the Federal Government by the states).[2]

In *General Motors Corp. v. Devex Corp.*, 461 U.S. 648 (1983), another case cited in the Kansas brief, this Court affirmed an award of prejudgment interest in a patent infringement suit under 35 U.S.C. § 284. The statute directed that "[u]pon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, . . . together with interest and costs as fixed by the court." 461 U.S. at 652. Decisions by the Court prior to the enactment of § 284 had generally limited awards of prejudgment interest from the date on which damages were liquidated, and prejudgment interest could only be awarded from the date of infringement

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[2] *Funkhouser v. J. B. Preston Co.*, 290 U.S. 163 (1933), the other contract case cited by Kansas as recognizing the compensatory nature of prejudgment interest, involved a New York statute providing for prejudgment interest in any action for breach of contract, whether liquidated or unliquidated, in which a sum of money was awarded by verdict, report, or decision. *Id.* at 165 & n.1. The issue in the case was whether the statute was an unconstitutional impairment of contracts that had been entered into prior to the adoption of the statute. The Court held that the allowance of interest in the case of unliquidated claims was an appropriate subject for legislative action. *Id.* at 168. The Court noted that some courts and commentators had recognized that a distinction simply between liquidated and unliquidated damages was not a sound one, although many jurisdictions continued to follow it. *Id.* at 168-69.

in exceptional circumstances, such as bad faith on the part of the infringer. *Id.* The Court held that the underlying purpose of § 284 strongly suggested that prejudgment interest should ordinarily be awarded, pointing out that a 1946 amendment had taken away the remedy of recovering the infringer's profits. *Id.* at 654.

City of Milwaukee and *General Motors* should be contrasted with *Wilkerson v. Ingalls Shipbuilding, Inc.*, 125 F.3d 904 (5th Cir. 1997), in which an employee claimed prejudgment interest on his disability claim under the Longshore and Harbor Workers' Compensation Act from the date of the injury – a permanent hearing loss resulting from noise he was exposed to at a shipyard. There was a twenty-year lag between the date of the injury and the claim. *Id.* at 906. The Fifth Circuit Court of Appeals agreed that there was a general rule that prejudgment interest should be awarded in maritime cases, but held that under the statute an employee's compensation claim becomes due, if not controverted, fourteen days after he files notice of the claim. *Id.* at 907-08. The Court of Appeals held that to hold that an employee is entitled to interest dating from the time he is injured, rather than fourteen days after he filed notice of the claim, would be to alter the amount of compensation he is due under the statute and thus undermine the will of Congress. *Id.* at 908.

Thus, an examination of the cases in which prejudgment interest is ordinarily awarded reveals that they depend on two prerequisites. First, prejudgment interest has historically been awarded in that area of the law (*e.g.*, admiralty cases), or there is a federal policy calling for complete compensation. Second, they involve an ordinary

commercial contractual arrangement, such as an agreement to pay money, or the party ordered to pay prejudgment interest knew, or should have known, that its actions involved an unreasonable risk of injury to the party claiming prejudgment interest or that its actions violated a federal statute.

In contrast to the cases cited by Kansas, prejudgment interest has not traditionally been awarded on damages for breach of contract unless the claim is liquidated. Even if *West Virginia v. United States* can be read to establish a rule that prejudgment interest should be awarded on damages for breach of any contract to pay money, absent some exceptional circumstance, and that a policy calling for complete compensation is likely to be present in any ordinary commercial contractual arrangement, the underlying claim in this case does not involve the breach of an agreement to pay money and the Arkansas River Compact is not an ordinary commercial contractual arrangement. *Cf. Kentucky v. Indiana*, 281 U.S. 163 (1930) (involving a contract for building a bridge across the Ohio River). Rather, the Compact apportions the waters of an interstate river, a delicate task that involves administrative control over the actions of private individuals. *See Colorado v. Kansas*, 320 U.S. 383, 392 (1943). There is no federal policy calling for complete compensation for losses suffered by individual water users resulting from the breach of an interstate compact. Indeed, the 11th Amendment reflects a policy that states would not be exposed to damages claims by private individuals. *Alden v. Maine*, 527 U.S. 706, ___, 119 S.Ct. 2240, ___, 144 L.Ed. 2d 636, 652, 657 (1999). Finally, at least for many years, this is not a case where Colorado knew, or should have

known, that post-Compact well pumping by private individuals in Colorado was causing violations of the Compact. Thus, the circumstances in this case do not support Kansas' contention that there is a "general rule" favoring an award of prejudgment interest in a case such as this one.

As this Court has recognized, there is a "venerable common-law rule that prejudgment interest is not awarded on unliquidated claims." *City of Milwaukee*, 515 U.S. at 197. The basis of the common-law rule is the perceived unfairness of making the breaching party pay interest on a claim when the breaching party could not know how much to tender to stop the accumulation of interest. *Wickham Contracting Co. v. Local Union No. 3, IBEW*, 955 F.2d 831, 835 (2d Cir.), *cert. denied*, 506 U.S. 946 (1992). The rule has been criticized on the grounds that it does not provide fair compensation to the non-breaching party. *See Miller v. Robertson*, 266 U.S. 243, 258 (1924). While some lower courts have concluded that the common-law rule has been replaced by a rule that an award of prejudgment interest is discretionary, *Wickham Contracting*, 955 F.2d at 835-36, the distinction between damages that are readily ascertainable and those that are not remains a factor that courts have continued to consider in determining whether a party breaching a contract should be treated as an involuntary investor for the non-breaching party. *Id.* at 836. Further, even in suits by the United States against a state or a political subdivision of a state, other than those where the underlying claim is a contractual obligation to pay money, prejudgment interest "is not recoverable according to a rigid theory of compensation for money withheld, but is given in response to considerations of fairness." *Board of Comm'rs of Jackson County v.*

United States, 308 U.S. at 352; *see also Wickham Contracting*, 955 F.2d at 836 (listing factors to be considered in an award of prejudgment interest, including fairness and the relative equities). Thus, even if an award of prejudgment interest is within the sound discretion of the Court in this case, the fact that Colorado did not know, or have reason to know, that post-Compact well pumping was depleting usable Stateline flows in violation of the Compact would be a relevant consideration of fairness in determining whether to award prejudgment interest. *See Board of Comm'rs of Jackson County v. United States*, 308 U.S. at 352-53; *see also Blau v. Lehman*, 368 U.S. 403, 414 (1962).

In summary, the facts in this case do not justify a deviation from the traditional common-law rule that prejudgment interest is not awarded on unliquidated claims. But, even if an award of prejudgment interest is discretionary, considerations of fairness would be relevant to an award of prejudgment interest.

II. *TEXAS V. NEW MEXICO* IS NOT DISPOSITIVE OF COLORADO'S LIABILITY IN THIS CASE

Kansas argues that Colorado is liable for the violation of the Compact by its water users, regardless of whether Colorado knew, or had reason to know, that the actions of its water users were causing depletions to usable Stateline flows. Kansas Brief at 11. In support of its position, Kansas relies heavily on the fact that New Mexico was held liable for the actions of its water users in *Texas v. New Mexico* and the Court's statement that "good-faith differences about the scope of contractual undertakings do not relieve either party from performance." Kansas Brief at 14-15, 19 n.4, citing *Texas v. New Mexico*, 482 U.S.

at 129.[3] However, there are important differences between *Texas v. New Mexico* and this case, differences that Kansas fails to recognize.

First, in the Pecos River Compact, 63 Stat. 159, New Mexico had agreed that any man-made activities in New Mexico that would deplete the flow of the Pecos River at the New Mexico-Texas state line below a specified amount were prohibited. The Pecos River Compact expressly provided that "*New Mexico shall not deplete by man's activities* the flow of the Pecos River at the New Mexico-Texas state line below an amount which will give to Texas a quantity of water equivalent to that available to Texas under the 1947 condition." *Texas v. New Mexico*, 462 U.S. 554, 559 (1983), *quoting* Pecos River Compact, Art. III(a) (emphasis added).

Second, in *Texas v. New Mexico*, it had been apparent almost from the beginning that the flows of the Pecos River at the state line were below the amount that would have been predicted on the basis of the Inflow-Outflow Manual that had been developed to determine the quantity of water that would be available to Texas under the 1947 condition. 462 U.S. at 558-59, 560. In 1957, the Pecos River Commission authorized a study and in 1962 adopted findings of fact regarding the cumulative shortfalls of state-line flows for the years 1950-1961. *Id.* at 560-61. The scope of New Mexico's obligation may have remained uncertain after 1961, but the existence of a dispute about whether New Mexico was allowing the

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[3] The Court's statement was made in response to New Mexico's argument that its good faith relieved it from any retrospective remedy whatsoever. 482 U.S. at 128-29.

flow of the Pecos River at the New Mexico-Texas state line to be depleted by man's activities below the "1947 condition" was clearly known to New Mexico from a very early date. *Id.*[4]

In contrast, the Arkansas River Compact did not prohibit future beneficial development of the Arkansas River Basin in either State by federal agencies, state agencies, or private individuals. Arkansas River Compact, Art. IV-D. The limitation imposed by the Compact was that "the waters of the Arkansas River . . . shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction." *Id.*

The Arkansas River Compact created an interstate agency known as the Arkansas River Compact Administration ("Administration"), consisting of three representatives from each State. Arkansas River Compact, Art. VIII-A and -C. The Administration is directed to investigate *promptly* violation of any of the provisions of the Compact and is authorized to report its findings and recommendations to the State official who is charged with the administration of water rights for appropriate action, "it being the intent of this Compact that enforcement of its terms shall be accomplished in general through the State agencies and officials charged with the administration of water rights." *Id.*, Art. VIII-H. Thus, Colorado believes that it should be liable under Article IV-D of the Compact

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[4] Texas finally brought suit in 1974, "after years of relatively fruitless negotiations." *Texas v. New Mexico*, 482 U.S. 124, 126 (1987).

only to the extent it knew, or should have known, that post-Compact well pumping was depleting usable State-line flows in violation of the Compact, but failed to act, just as New Mexico knew that state-line flows of the Pecos River were below the amount that would have been predicted using the Inflow-Outflow Manual, but took no action. *Cf. Wyoming v. Colorado*, 286 U.S. 494, 497, 509-10 (1931) (finding that Wyoming's bill was not defective because it alleged that diversions were made in excess of decree "with the knowledge, permission and cooperation of Colorado."). At the very minimum, the fact that Colorado did not know, or have reason to know, that post-Compact well pumping in Colorado was depleting usable Stateline flows should be a factor in extenuation in awarding any damages, and especially prejudgment interest, during that period. *See Wyoming v. Colorado*, 309 U.S. 572, 582 (1940) (period of uncertainty considered as an extenuating factor in determining whether Colorado should be held in contempt for violation of a decree of the Court equitably apportioning the Laramie River).

In this case, Kansas, unlike Texas, did not request an investigation of post-Compact well pumping by the Administration until 1985. Third Report at 103. In contrast to *Texas v. New Mexico*, there was no awareness by either State of depletions to usable Stateline flows in the years immediately following the adoption of the Compact. In *Texas v. New Mexico*, both States were aware there were shortfalls, but could not agree on how to determine the amount of water that Texas was entitled to receive under the 1947 condition. In contrast, here the Master stated: "I am confident that in 1950, the first year after the compact was signed, and in the early years thereafter, *no*

one had any thought that the compact was being violated." Third Report at 100 (emphasis added). Moreover, sophisticated computer modeling was necessary to determine depletions to Stateline flows. *Id.* at 106.

Colorado agrees that as of 1985, there was a good-faith dispute about the impact of post-Compact well pumping on usable Stateline flows and that Colorado's good-faith is not a defense to a violation of the Compact after 1985. Before that date, however, Colorado was not on notice that post-Compact well pumping was depleting usable Stateline flows in violation of the Compact, and the Administration had made no investigation and no findings of fact or recommendations to State officials in Colorado charged with the administration of water rights regarding post-Compact well pumping. First Report at 155-56. Nor had Kansas made any complaint about post-Compact well pumping until 1985. Third Report at 103.

III. EVEN IF AN AWARD OF PREJUDGMENT INTEREST IS DISCRETIONARY, THE CIRCUMSTANCES OF THIS CASE DO NOT SUPPORT AN AWARD OF PREJUDGMENT INTEREST BEFORE 1985

As Kansas admits, the prejudgment interest inquiry is governed by traditional judge-made principles, inasmuch as Congress has not enacted a statute on the subject. Kansas Brief at 12, citing *City of Milwaukee v. Cement Div., National Gypsum Co.*, 515 U.S. 189, 194 (1995). Kansas argues that the present case is in essence a contract case because the Compact is a contract, Kansas Brief at 13, and that prejudgment interest should be awarded to ensure

that Kansas is fully compensated. *Id.* Kansas acknowledges that even in cases where prejudgment interest is ordinarily awarded, an award of prejudgment interest is not automatic, but rests in the discretion of the tribunal passing on the subject, *id.*, citing *City of Milwaukee*, 515 U.S. at 196, but says that as with other discretionary determinations, the Court's decision must be supported by a circumstance that has relevance to the issue at hand. *Id.* Specifically, Kansas argues that the defendant's good-faith belief that it is not responsible for the plaintiff's loss is not such a circumstance. *Id.* at 14.

In Section I of this brief, Colorado has shown that there is no "general rule" favoring an award of prejudgment interest in a case such as this. However, even if this is a case in which an award of prejudgment interest is within the sound discretion of the Court, the circumstances in this case would not support an award of prejudgment interest before 1985. First, the primary reason for awarding prejudgment interest on damages is to compensate the plaintiff for the loss of use of money due under a contract or as damages from the time the claim accrues until judgment is entered. *City of Milwaukee*, 515 U.S. at 195-96. Awarding prejudgment interest also discourages defendants from delaying payment of a debt or damages. *General Motors*, 461 U.S. at 655 n.10; *see United States v. Texas*, 507 U.S. at 537. However, in the typical case where prejudgment interest is awarded, the claim did not accrue until the defendant knew, or should have known, that its performance was due under a contract, *e.g., United States v. Texas*, 507 U.S. at 532 (Federal Government notified Texas of its debt and informed it that

prejudgment interest would begin to accrue on the balance unless payment was made within 30 days), or the defendant knew or should have known that its actions involved an unreasonable risk of causing injury and those actions caused an injury or loss to the plaintiff. *E.g., City of Milwaukee*, 515 U.S. at 191. In those circumstances, a defendant's good-faith belief that it is not responsible for the plaintiff's loss does not relieve it of the obligation to pay prejudgment interest. *Id.* at 196-97.

Here, Kansas did not request an investigation of a Compact violation until 1985, and Colorado did not know, or have reason to know, that post-Compact well pumping in Colorado was causing depletions to usable Stateline flows for many years. Moreover, contrary to the Master's finding that Colorado knew, or should have known, by 1968 that post-Compact wells were causing material depletions of usable Stateline flows, Third Report at 103, this Court found that the same evidence was too vague and conflicting to demonstrate that Kansas inexcusably delayed in bringing its claim. *Kansas v. Colorado*, 514 U.S. at 688-89. If the evidence was too vague and conflicting to alert Kansas to the need to request an investigation of a Compact violation by the Administration, Colorado should not be charged with knowledge of a Compact violation and failure to act on the basis of the same evidence.[5]

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[5] The Master's view seems to be that by 1968 *both* States knew, or should have known, that post-Compact well pumping in Colorado was depleting usable Stateline flows. In his First Report, the Master said that there was no specific evidence to explain why Kansas failed to request an investigation before 1985, but said that Kansas may have been relying on Colorado's efforts to regulate wells. First Report at 170. He also pointed out the difficulty of determining depletions to usable Stateline flows on the basis of the available evidence. *Id.* at 162-63. The Court did not fully adopt the Master's findings in its 1995 opinion. Rather, the Court held that the evidence available to Kansas was vague and conflicting. *Kansas v. Colorado*, 514 U.S. at 688-89. Even if the Court were to accept the Master's finding that the 1968 Wheeler Report was sufficient to trigger Colorado's obligation to enforce the Compact, the Court should take into consideration the fact that sophisticated computer models necessary to determine depletions to Stateline flows were not available in 1968 and that there were other developments in the 1970s and early 1980s that made it difficult to determine depletions due to post-Compact well pumping. *See* Colorado's Brief in Support of Its Exceptions to the Third Report of the Special Master 30-37. As the Master previously stated: "Experts for both States testified that the only way to isolate depletions caused by postcompact pumping, as opposed to depletions caused by other changes along the stream system, was through the use of hydrologic modeling." App. to Second Report at 16.

Thus, even if this is a case in which an award of prejudgment interest is discretionary, prejudgment interest should not be awarded on damages until 1985, the date Kansas requested an investigation by the Administration. Awarding prejudgment interest on damages prior to the date that Colorado knew, or should have known, of a Compact violation is not consistent with other cases in which prejudgment interest has been awarded and would not encourage state agencies and officials charged with the administration of water rights to act to enforce the terms of the Compact.

IV. THE CONSIDERATIONS IDENTIFIED BY THE MASTER FULLY SUPPORT THE DENIAL OF PREJUDGMENT INTEREST BEFORE COLORADO KNEW, OR SHOULD HAVE KNOWN, THAT POST-COMPACT WELL PUMPING WAS DEPLETING USABLE STATELINE FLOWS

Kansas argues that the Master's denial of prejudgment interest for the period 1950-1968 must find justification in some exceptional circumstance rendering an award of interest unfair. Kansas Brief at 18. This argument is predicated upon Kansas' assertion that there is a "general rule" that prejudgment interest should be awarded in a case such as this, absent some exceptional circumstance, *see* Section I *supra*, and fails to recognize that even in cases where prejudgment interest is ordinarily awarded, an award of prejudgment interest "is by no means automatic." *E.g., United States v. Texas*, 507 U.S. at 536. Even if the Court were to accept Kansas' "general rule," the considerations identified by the Master fully support the denial of prejudgment interest before Colorado knew, or should have known, that post-Compact well pumping was depleting usable Stateline flows.

Kansas states that the Master identified three circumstances that, in his view, made this case exceptional, but argues that none of these circumstances supports the denial of prejudgment interest for the years 1950-1968. Kansas Brief at 18-19. According to Kansas, the three circumstances identified by the Master are: (1) the "great length of time," at least 50 years, since pre-Compact well pumping began to deplete usable Stateline flows in violation of the Compact; (2) the fact that Colorado, like Kansas, was unaware in the early years that depletions were

occurring in violation of the Compact; and (3) the fact that Colorado farmers experienced most of the benefits, while Kansas farmers experienced most of the losses, from the violations of the Compact. *Id.*

Kansas' summary does not fully describe the circumstances identified by the Master for recommending that prejudgment interest be denied for the years 1950-1968. The Master not only found that for many years neither State was aware that post-Compact well pumping in Colorado was violating the Compact, Third Report at 100, 106, but also pointed out the difficulty of determining the impact of post-Compact well pumping on usable Stateline flows:

> The general lack of knowledge in the early years about pumping in Colorado and its impacts along the Arkansas River served to protect Kansas during the liability phase of the case against a claim of laches. The same degree of fairness, I believe, should now relieve Colorado of the obligation to pay full interest rates on damages from depletions during [the]1950-68 period, *which now only with hindsight and the benefit of sophisticated computer modeling can be found to have occurred.*

Id. at 106 (emphasis added).[6]

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[6] Kansas argues that the simple passage of time is not a reason to deny prejudgment interest and that the Master's "startled reaction" to the effect of compounding damages over 50 years is not a proper basis on which to exercise discretion. Kansas Brief at 19-21. The Master did not rely on the "startling results" or the "dramatic impact" of awarding prejudgment interest alone as a basis for recommending the denial of

Colorado disagrees with the Master's finding that by 1968 Colorado knew, or should have known, that post-Compact wells were depleting usable Stateline flows, but fully agrees with the Master that the lack of knowledge of a Compact violation by either State and the difficulty of determining that post-Compact well pumping in Colorado was depleting usable Stateline flows are appropriate factors to consider in determining whether prejudgment interest should be awarded in this case. *See Board of Comm'rs of Jackson County v. United States*, 308 U.S. at 352 (fact that County did not know that taxes were improperly levied on an Indian allotment considered in denying prejudgment interest).

Furthermore, the difficulty of determining that post-Compact well pumping was depleting usable Stateline flows was not limited to the period 1950-1968. *See* Colorado's Brief in Support of Its Exceptions to the Third Report of the Special Master 34-35. Because of that difficulty, and the fact that the evidence available to Kansas that post-Compact well pumping was depleting usable Stateline flows was vague and conflicting, the Court held that Kansas could not be charged with lack of diligence in making its well pumping claim before 1985. *Kansas v. Colorado*, 514 U.S. at 688-89. Even in 1990, Kansas had enormous difficulty proving that post-Compact well pumping had depleted usable Stateline flows in violation of the Compact. As the Master stated in his First Report:

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prejudgment interest. Rather, he pointed them out because they dramatize the effect of awarding prejudgment interest in this case. *See* Third Report at 100.

> The major changes in Kansas' position and evidence cannot be ignored. For some five years the Kansas experts worked to accumulate the necessary data and to develop the H-I model in order to support the state's claims. Yet after Colorado's cross-examination during trial uncovered numerous errors and shortcomings in the Kansas evidence, and after the trial recess caused by Durbin's hospitalization, Kansas' replacement experts testified to substantially different conclusions than those resulting from the original H-I model. Brent E. Spronk, one of Kansas' replacement experts, testified openly that the results of the original H-I model were not reliable. As part of its replacement case, Kansas made numerous changes to the original H-I model, but did not alter its basic logic and structure. In addition, Kansas submitted 63 revised exhibits and 10 new exhibits. *As a result of these changes, Kansas cut its claimed depletions approximately in half. . . .*

First Report at 236-37 (emphasis added) (footnotes and citations omitted).[7]

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[7] Timothy J. Durbin was Kansas' chief technical witness. First Report at 228. He developed the Kansas Hydrologic-Institutional (H-I) model to quantify the impacts of individual causes of depletions, including post-Compact well pumping, on Stateline flows. *Id.* at 229-30. After cross-examination, but before he could begin his redirect testimony, he "suffered a breakdown and was admitted to a psychiatric hospital." *Id.* at 28. Kansas then moved for a continuance to replace him with other experts. *Id.* at 29. Over Colorado's objection, the Master granted a seven-month continuance to allow Kansas to replace Durbin with other experts and to correct and make substantial changes to the H-I Model. *Id.* at 30, 241. With the continuance, and Colorado's need to undertake discovery to respond to the

While, as this Court noted in *Texas v. New Mexico*, "[t]here is often a retroactive impact when courts resolve contract disputes about the promisor's undertaking," in the typical case the defendant knew, or should have known, the nature of its undertaking, despite the dispute about the scope of that undertaking. *E.g., West Virginia v. United States*, 479 U.S. at 307 (West Virginia acknowledged the bills from the Corps but denied liability for the debt on the grounds that the State official entering into the agreement had acted without authority); *cf. United States v. Texas*, 507 U.S. at 531-32 (Texas, through its Department of Human Resources, contractually bound itself to comply with all federal regulations governing the Food Stamp Program, but challenged administrative refusal to grant a waiver of liability and contested liability for prejudgment interest.). The fact that there is a good-faith difference about the scope of a contractual obligation does not relieve either party from performance. *Texas v. New Mexico*, 482 U.S. at 129. In this case, however, there was no good-faith difference about the scope of Colorado's obligation under the Compact or its liability for any losses until 1985. Prior to that time, Colorado believed it was in compliance with the Compact, First Report at 169 ("I do not believe that Colorado officials thought they were sanctioning a compact violation in the well regulations that were established, . . . "), and Kansas had made no complaint about post-Compact well pumping in Colorado. Third Report at 103 ("It is

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revisions and changes by the Kansas replacement experts, it was more than a year before Kansas resumed what it called its "replacement case." *Id.* at 29.

essentially correct that Kansas did not register a formal complaint until 1985, . . . "). Moreover, the Administration had felt no need to undertake an investigation of a Compact violation or to report any findings or recommendations to Colorado officials charged with the administration of water rights for appropriate action. *See* Arkansas River Compact, Art. VIII-H.

The 1968 Wheeler Report, which the Master relies upon as the basis for his finding that by 1968 Colorado knew, or should have known, the impact of post-Compact wells on usable Stateline flows, Third Report at 104, is one of the reports that were available to Kansas and which this Court found were "vague and conflicting" about the impact of post-Compact well pumping on usable Stateline flows. *Kansas v. Colorado*, 514 U.S. at 688-89. Of particular significance, the 1968 Wheeler Report did not consider the effect of increased transmountain imports, which to some extent provided an offset to pumping. *Id.* at 689, *quoting* First Report at 162-63. If the Court accepts the Master's finding that by 1968 Colorado knew, or should have known, that post-Compact wells were causing material depletions of usable Stateline flows, Third Report at 103, then, in fairness, the Court should reconsider its earlier decision that Kansas did not have sufficient evidence available to complain about post-Compact well pumping in Colorado prior to 1985.[8]

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[8] The Master states that the problems of data collection are also enormous in this case. Third Report at 102. Colorado notes that data concerning the number of wells, where they were located, and how much water they pumped were developed by

The Master also recommends that prejudgment interest be awarded on damages, at least from the date Colorado knew, or should have known, of the impact of post-Compact wells on usable Stateline flows because, though a compact deals in water rather than money, "many of the same policies calling for prejudgment interest in general contract situations also apply to interstate water disputes." Third Report at 102. He states:

> The upstream state has a natural geographic advantage. It has first access to the water. It can take what it wants, leaving the downstream state to complain if the upstream use exceeds its compact share. An enforcement action by the downstream state is not only difficult and expensive, it almost always requires years to complete. Generally, a preliminary injunction is not available, and the upstream state continues to have use of water during the long trial. . . .

Id.

While some of the policies favoring an award of prejudgment interest in general contract situations may apply to this case once Colorado knew, or should have

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the U.S. Geological Survey in the 1960s in cooperative studies with Colorado. *See* Colorado's Brief in Support of Its Exceptions to the Special Master's Third Report 32-33; App. to Colorado's Brief, Item 1 (Jt. Exh. 66). The difficulty in determining the impact of post-Compact well pumping on usable Stateline flows was not the lack of data about the number of wells, where they were located, or how much water they had pumped, but the difficulty in determining the impact of pumping on usable Stateline flows and the lack of sophisticated computer models necessary to quantify the effects of well pumping on usable Stateline flows. *Id.* at 30-37.

known, that post-Compact well pumping was depleting usable Stateline flows, some of the Master's comments are wide of the mark.

The fact that Colorado is the upstream state is not of great significance to this Compact.[9] Article IV-D of the Compact did not apply only to Colorado; it applied to future beneficial development in the Arkansas River Basin in both states. Post-Compact well pumping in Kansas can also deplete the waters of the Arkansas River available for use by water users in Colorado if it has the effect of causing Kansas to demand additional releases of water stored in John Martin Reservoir. First Report at 223.

Not every enforcement action is difficult or expensive; this action was particularly difficult and time consuming because of the nature of the post-Compact development involved. Moreover, the fact that enforcement actions may be expensive and time-consuming underscores the fact that this Compact created an Administration with authority to investigate violations of the Compact, to make findings and recommendations to State

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[9] If Colorado has a natural geographic advantage with respect to the waters of interstate rivers, it also has a greater burden to administer water use to comply with interstate water compacts than most downstream states. The headwaters of four major rivers originate in Colorado – the Colorado, the Platte (both North and South), the Rio Grande, and the Arkansas. Colorado is a party to nine interstate water compacts and two equitable apportionment decrees entered by this Court. *See* Colo. Rev. Stat. §§ 37-61-101 to 37-69-101 (setting forth the text of the compacts); *Wyoming v. Colorado*, 259 U.S. 419 (1922) (Laramie River); *Nebraska v. Wyoming*, 325 U.S. 589 (1945) (North Platte River).

officials charged with administration of water rights for appropriate action, and that it was the intent of this Compact that enforcement of its terms be accomplished in general through the State agencies and officials charged with the administration of water rights. Arkansas River Compact, Art. VIII-A, -C, and -H. These provisions in the Compact demonstrate that the policies favoring an award of prejudgment interest apply in this case only when the defendant state knew, or should have known, that a post-Compact development was depleting the waters of the Arkansas River in violation of the Compact. Implicitly, the Master supports an award of prejudgment interest as a method to encourage an upstream state not to withhold water in violation of a compact. Such encouragement, however, can only operate when a state knows, or has reason to know, of a violation of a compact.

V. ARTICLE VII-A OF THE COMPACT DOES NOT MAKE COLORADO LIABLE FOR VIOLATIONS OF THE COMPACT, WHETHER OR NOT COLORADO KNEW, OR HAD REASON TO KNOW, OF SUCH VIOLATIONS

Kansas argues that Colorado is liable for a violation of the Compact caused by the actions of water users in Colorado, and must fully compensate Kansas for such depletions, whether or not Colorado knew, or had reason to know, of such violations on the grounds that "the Compact's express language does not admit of a distinction between a State and its water users." Kansas Brief at 26, citing Arkansas River Compact, Article VII-A. Article VII-A provides as follows:

> A. Each State shall be subject to the terms of this Compact. Where the name of the State or the term "State" is used in this Compact these shall be construed to include any person or entity of any nature whatsoever using, claiming or in any manner asserting any right to the use of the waters of the Arkansas River under the authority of that State.

Kansas argues that because the Compact states that one of the major purposes of the Compact was to "apportion between the States of Colorado and Kansas the waters of the Arkansas River and their utilization . . . ," Arkansas River Compact, Art. I-B, that means that the States and their water users are treated as one.

Colorado agrees that one of the major purposes of the Compact was to apportion the waters of the Arkansas River between Colorado and Kansas and that water users in Colorado are subject to the terms of the Compact. That would have been true without Article VII-A of the Compact. *Hinderlider v. La Plata & Cherry Creek Ditch Co.*, 304 U.S. 92, 106 (1938). Article VII-A simply makes that explicit. *Cf. Badgley v. City of New York*, 606 F.2d 358, 364-66 (2d Cir. 1979) (decree in *New Jersey v. New York*, 347 U.S. 995 (1954), equitably apportioning the Delaware River and its tributaries between New York, New Jersey, and Pennsylvania was conclusive upon all Pennsylvania citizens and their riparian rights), *cert. denied*, 447 U.S. 906 (1980). Colorado agrees that Kansas can enforce the Compact by an injunction against Colorado and that water users in Colorado are also bound by such an injunction. However, whether Colorado is liable for losses, including losses to individual water users in Kansas, due to depletions to usable Stateline flows caused by

the actions of private individuals in Colorado, and prejudgment interest on such losses, prior to the time Colorado knew, or should have known, that such actions were causing a Compact violation is a different question, and must be answered by the terms of the Compact.

This Compact did not prohibit future beneficial development in the Arkansas River Basin by private individuals in either State. The Compact does not address remedies for violation of the Compact, liability for losses suffered by individual water users in the event of a Compact violation, or prejudgment interest. However, the Compact did create an Administration to investigate violations of the Compact and stated that it was "the intent of *this Compact* that enforcement of its terms shall be accomplished in general through the State agencies and officials charged with the administration of water rights." Arkansas River Compact, Art. VIII-H (emphasis added). Consistent with that intent, Colorado believes that it was the intent of the States that they would only be liable for violations of the Compact caused by a post-Compact development where the State knew, or had reason to know, of the violation. Had it been the intent of the States that they would be liable for any violation of the Compact caused by a post-Compact development, the States would have wanted an objective standard to determine each State's entitlement, such as the "1947 condition" in the Pecos River Compact or Article III(d) of the Colorado River Compact.[10] Without some objective standard for

[10] Article III(d) of the Colorado River Compact provides: "The states of the Upper Division will not cause the flow of the river at Lee['s] Ferry to be depleted below an aggregate of

determining each State's entitlement under the Compact, the States would have been undertaking a risky obligation to become liable for all depletions of waters of the Arkansas River usable to water users in the other State, whether they knew, or had reason to know, of the violation. Without a clear expression of intent to undertake such a liability, a compact should not be interpreted to impose such a liability upon a state. *Cf. Alden v. Maine*, 527 U.S. at ___, 119 S.Ct. at ___, 144 L.Ed. 2d at 675 (1999) (noting that Congressional power to authorize suits for compensatory damages by individuals against states could create staggering burdens).

Kansas also argues that Colorado's lack of knowledge is "irrelevant to the issue of whether the plaintiff should be compensated for its loss." Kansas Brief at 24. Kansas argues that "[w]hether or not the parties had any inkling of Colorado's breach of the Compact in the early years, the fact remains that Colorado had use of both water, an asset belonging to Kansas, and the income that it generated." *Id.* at 24-25.

As the Master recognized, Colorado itself did not have use of the water. Third Report at 101. Private individuals in Colorado, not the State of Colorado, pumped and used the ground water. Further, usable Stateline flows are not an asset used by the State of Kansas. Under the laws of Kansas, private individuals and other entities

75,000,000 acre-feet for any period of ten consecutive years reckoned in continuing progressive series beginning with the first day of October next succeeding the ratification of this Compact." *See Arizona v. California*, 373 U.S. 546, 557-58 & n.20 (1963).

use the waters of the Arkansas River, and Article IV-D was intended to protect water users in Kansas, not the State of Kansas, from depletions to usable Stateline flows caused by future development. An award of damages to the State of Kansas based on the losses suffered by private individuals as the result of a violation of the Compact is not "compensatory" in any ordinary sense of the word, Third Report at 101, and an award of prejudgment interest should not result in overcompensating Kansas. *See Commercial Union Assur. Co. v. Milken*, 17 F.3d 608, 614 (2d Cir.), *cert. denied*, 513 U.S. 873 (1994); *United States v. Foster Wheeler Corp.*, 447 F.2d 100, 102 (2d Cir. 1971) (prejudgment interest disallowed under False Claims Act because double damages and forfeiture payments more than made the Government whole).

If Kansas were acting as a trustee for its water users to present and enforce their individual claims against Colorado, an award of damages for losses suffered by individual water users would be compensatory, but it would also violate the 11th Amendment. *See* Colorado's Brief in Support of Its Exceptions to the Third Report of the Special Master 13-21, and cases cited therein. Had there been no post-Compact well pumping in violation of the Compact, the State of Kansas would not have received money equivalent to the losses of its water users. Third Report at 101. The impact on the State of Kansas would have been limited to an increase in income tax revenues and the secondary impacts to the Kansas economy. *Id.*

Thus, if the Court accepts the Master's recommendation that Kansas should be awarded damages for all losses resulting from depletions to usable Stateline flows

caused by post-Compact well pumping, including the losses suffered by individual water users, such an award is more than adequate to make the State of Kansas whole for income tax losses and secondary impacts to the Kansas economy and should not include prejudgment interest. *E.g., United States v. Foster Wheeler Corp.*, 447 F.2d at 102. Further, an award of damages based on the losses suffered by individual water users in Kansas should depend on a finding that Colorado knew, or should have known, that post-Compact well pumping in Colorado was depleting usable Stateline flows in violation of the Compact, but failed to act to enforce the terms of the Compact. At that point, an award of damages based on the losses suffered by individual water users, while still not compensatory, might serve the purpose of encouraging a state to act to enforce the terms of the Compact. *See* Arkansas River Compact, Art. VIII-H. For the reasons previously stated, however, Colorado does not believe that Colorado should be charged with knowing, or that it should have known, that post-Compact well pumping in Colorado was depleting usable Stateline flows in violation of the Compact until 1985, when Kansas requested an investigation by the Administration. First Report at 155-56 ("The record supports Colorado's assertion that no formal complaint to the compact administration, or indeed to any appropriate Colorado officials, was made before 1984 (if the Simons, Li report is considered as such) or otherwise before 1985, when Kansas asked the compact administration to undertake an Article VIII-H investigation.").

Kansas further argues that, "consistent with th[e] definition [in Article VII-A] is the Compact's purpose to

resolve disputes and controversies, not only between the States as such, but also 'between citizens of one and citizens of the other State.' " Kansas Brief at 26, *quoting* Arkansas River Compact, Art. I-A. That was, in fact, one of the purposes of the Compact, and states have the power to settle disputes between their citizens over the use of waters of an interstate river by entering into a compact. *Hinderlider*, 304 U.S. at 106-08. However, merely entering into a compact to resolve disputes and controversies "between citizens of one and citizens of the other State" does not waive the State's 11th Amendment immunity to suits by citizens of the other State. *See Port Authority Trans-Hudson Corp. v. Feeney*, 495 U.S. 299, 305 (1990) (waiver of 11th Amendment immunity must be express or by overwhelming implication from the text). Nor does it suggest that Colorado agreed to become liable to Kansas for all losses that occurred as a result of a violation of the Compact by future beneficial development, including losses suffered by individual water users in Kansas, and prejudgment interest on such losses.

Finally, Kansas says that this Court has previously determined in this case that Colorado "bears liability for the actions of its water users." Kansas Brief at 27, citing *Kansas v. Colorado*, 514 U.S. at 693-94. In fact, all the Court did was agree with the Special Master's conclusion that post-Compact well pumping in Colorado had caused material depletions of the usable Stateline flows of the Arkansas River, in violation of the Arkansas River Compact. At that time, the Special Master had not determined the amount of such depletions or when such depletions had occurred, or whether Colorado knew, or should have known, that post-Compact well pumping was depleting

usable Stateline flows prior to 1985 when Kansas made a complaint to the Administration. All of those issues, including the extent of Colorado's liability for such depletions, were deferred to additional proceedings.

CONCLUSION

1. There is no "general rule" that prejudgment interest should be awarded in a case such as this, absent some exceptional circumstance. The common-law rule is that prejudgment interest is not awarded on unliquidated claims, and there is no reason to deviate from the common-law rule in this case.

2. Even if the Court concludes that an award of prejudgment interest is within the sound discretion of the Court, an award of prejudgment interest would not be justified in this case before Colorado knew, or should have known, that post-Compact well pumping was depleting usable Stateline flows in violation of the Compact.

3. Neither *Texas v. New Mexico* nor the express terms of the Compact suggest that Colorado should be held liable for a violation of the Compact by its water users, regardless of whether it knew, or should have known, that post-Compact well pumping was causing depletions to usable Stateline flows in violation of the Compact. If Kansas is awarded damages based on the losses suffered by individual water users in Kansas, such an award is more than adequate to make the State of Kansas whole for income tax losses and secondary impacts to the

Kansas economy and should not include prejudgment interest.

Respectfully submitted,

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In The

Supreme Court of the United States

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

and

UNITED STATES OF AMERICA,

Defendant-Intervenor.

REPLY BRIEF FOR KANSAS OPPOSING THE EXCEPTIONS OF COLORADO

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REPLY BRIEF FOR KANSAS OPPOSING THE EXCEPTIONS OF COLORADO

SUMMARY OF ARGUMENT

Early in its brief Colorado emphasizes that water is a scarce resource in the West, that disputes over water have propelled the development of new legal doctrines and institutions, and that ongoing disputes likely will only heighten the need for clear remedies in this field of law. This emphasis on the importance of a clear remedy in an interstate water dispute makes for a peculiar introduction to a brief urging this Court to withhold a remedy for all but a small fraction of the injury that Kansas and its water users undisputedly suffered. In its own words, Colorado would have this Court reject as unfair "[a]n award of money damages that includes all losses that have occurred as a result of Compact violations, including losses suffered by individual water users in Kansas." Brief in Support of Colorado's Exceptions to the Third Report of the Special Master 9 ("Colo. Brief"). Kansas' reply can be summed up in a single sentence: Kansas should receive a complete remedy for its losses, no more and no less.

Colorado has filed four exceptions to the Third Report of the Special Master. The first exception opposes the Special Master's recommendation that the losses of Kansas water users be accounted for in determining Kansas' damages for Colorado's violations of the Arkansas River Compact. Colorado overlooks the fact that in the plan of the convention it surrendered its immunity to proper original actions such as this one. Both this Court's Eleventh Amendment jurisprudence and the Arkansas River Compact confirm that this action is proper.

Colorado raises two further exceptions, and focuses three separate points of its brief, on the subject of prejudgment interest. Its several arguments are united, however, by a common premise, which is that an injured party's compensation should be reduced or denied where the breaching party has acted in good faith. This premise is contrary to the Court's modern decisions. Full compensation is not punitive; it is the fair and equitable outcome. Because Colorado's second and third exceptions run afoul of this basic proposition, they should be overruled.

Colorado's fourth exception asks the Court to delve into the Special Master's analysis of the evidence from experts in the fields of engineering, economics and agronomy regarding crop losses caused by Colorado's Compact violations in canal irrigation service areas where farmers could not replace the shortfall in surface water supplies with groundwater because they had no wells. Colorado asks that the mere possibilities raised by its arguments be exalted over the solid evidence presented by the Kansas experts. The thorough analysis performed and explained by the Special Master should therefore be sustained.

I. THE ELEVENTH AMENDMENT IS NO BARRIER TO KANSAS' CLAIMS IN THIS PROPER ORIGINAL ACTION.

The Special Master recommended that the Court confirm his ruling "that if a remedy includes money damages, the Eleventh Amendment does not preclude damages awarded to the State of Kansas from being based, in part, upon losses incurred by its water users."

1 Third Report of Special Master 119 (¶ 3) ("Third Report"). Colorado excepts to this recommendation on the ground that the Eleventh Amendment bars a state from recovering money damages in a quasi-sovereign capacity based on losses to its water users. Colo. Brief 10-24. Colorado's argument fails for at least three reasons: *first*, Colorado, in the plan of the convention, surrendered its immunity to suits such as this one between sister States; *second*, the plain language of the Arkansas River Compact establishes Kansas' sovereign right to bring suit against Colorado to protect its own interests, which include the interests of its water users; and, *third*, the Court's decisions likewise establish that Kansas' suit properly seeks to vindicate its sovereign and quasi-sovereign interests rather than the purely personal claims of its citizens.

A. Colorado Surrendered Its Immunity to Suit by a Sister State in the Plan of the Convention.

When this Court granted Kansas leave to file a complaint, it implicitly determined that this is a proper original action. *Kansas v. Colorado*, 475 U.S. 1079 (1986). The Special Master considered the Court's determination to be dispositive of any objection based on the Eleventh Amendment. He explained "that if the Court accepts a case between states as one involving sovereignty or quasi-sovereignty, it is then regarded, in law, strictly as state litigation, and the 11th Amendment is not a factor." 2 Third Report, App. 36. He particularly emphasized this Court's pronouncement in *Texas v. New Mexico*, 482 U.S. 124 (1987), that "[i]n *proper original actions, the Eleventh Amendment is no barrier, for by its terms, it applies only to*

suits by citizens against a State." Id., at App. 35 (quoting *Texas v. New Mexico*, 482 U.S., at 130) (Special Master's emphasis).

A proper suit between sister States is indeed outside the ambit of the Eleventh Amendment. *Blatchford v. Native Village of Noatak*, 501 U.S. 775, 782 (1991); *Principality of Monaco v. Mississippi*, 292 U.S. 313, 328-329 (1934); *Rhode Island v. Massachusetts*, 12 Pet. 657, 720 (1838). The Eleventh Amendment confirms the presupposition that the States, upon entering into the Union, generally retained the immunity to suit enjoyed by sovereigns. *Alden v. Maine*, 119 S.Ct. 2240, 2246-2247 (1999). One of a few distinct classes of cases in which the States do not retain immunity, however, is where there has been " 'a surrender of this immunity in the plan of the convention.' " *Id.*, at 2248 (quoting The Federalist No. 81); *Idaho v. Coeur d'Alene Tribe*, 521 U.S. 261, 267 (1997). The States surrendered their immunity to suit by sister States in this Court to afford an adequate means of settling their disputes peacefully and without resort to the traditional methods of diplomacy and war, which were deemed impracticable. *Alfred L. Snapp & Son v. Puerto Rico, ex rel., Barez*, 458 U.S. 592, 601 (1982); *Kansas v. Colorado*, 206 U.S. 46, 97 (1907). This Court has explained:

> "The establishment of a permanent tribunal with adequate authority to determine controversies between the States, in place of an inadequate scheme of arbitration, was essential to the peace of the Union. The Federalist, No. 80; Story on the Constitution, § 1679. With respect to such controversies, the States by the adoption of the Constitution, acting 'in their highest sovereign capacity, in the convention of the people,'

> waived their exemption from judicial power. The jurisdiction of this Court over the parties in such cases was thus established 'by their own consent and delegated authority' as a necessary feature of the formation of a more perfect Union." *Principality of Monaco v. Mississippi*, 292 U.S. 313, 328-329 (1934) (quoting *Rhode Island v. Massachusetts*, 12 Pet. 657, 720 (1838)).

By consenting to this Court's "complete judicial power to adjudicate disputes among them," this Court acquired "the capacity to provide one State a remedy for the breach of another." *Texas v. New Mexico*, 482 U.S., at 128 (citing *Rhode Island v. Massachusetts*, 12 Pet. at 720). And with regard to interstate compacts, in particular, this Court has affirmed its readiness both to rectify a breaching State's past failure to perform and to order its future performance. *Ibid.*

Colorado nevertheless argues that the Eleventh Amendment bars the damages sought by Kansas insofar as they are based on losses to its water users. It bears emphasizing that Kansas seeks to recover simply the value of the waters of the Arkansas River that Colorado has failed to deliver in breach of the Compact. That recovery is measured in part by injury to the interests of Kansas as a State, and in part by the income lost or cost incurred by Kansas water users (such as lost crop yields and increased well-pumping costs) as a result of Colorado's breach. See, *e.g.*, 1 Third Report 36, 64. Kansas believes that to restore that value to it is in no sense to sanction a recovery on individual claims, but simply to afford Kansas a complete remedy for the Compact breach. Colorado contends, however, that to recognize such a remedy is to allow Kansas "to present and enforce the

claims of its citizens." Colo. Brief 13 (capitalization omitted).

The Special Master properly rejected the notion that Kansas is asserting personal, private claims of its citizens. 2 Third Report, App. 21. He noted that a State properly represents the water claims of its people in an interstate controversy, just as a State's undertakings in an interstate compact are binding on its water users. *Id.*, at App. 32 (citing *Hinderlider v. La Plata River & Cherry Creek Ditch Co.*, 304 U.S. 92, 106 (1938); *Wyoming v. Colorado*, 286 U.S. 494, 508-509 (1932)). Both the language of the Arkansas River Compact and this Court's Eleventh Amendment jurisprudence establish that Kansas has brought a proper original action between sister States rather than the private claims of its individual citizens.

B. The Arkansas River Compact Establishes Kansas' Sovereign Right to Bring Suit Against Colorado to Protect Its Own Interests, Which Include the Interests of Its Water Users.

The Compact, which after all is a contract between Kansas and Colorado, *Texas v. New Mexico*, 482 U.S., at 128, is the obvious starting point in an analysis of the rights and duties that Kansas can enforce in this case. Indeed, Colorado itself recognizes that the applicability of the Eleventh Amendment should be analyzed on the basis of the "nature and origin of the claims on which damages are based." Colo. Brief 23. It is curious, then, that Colorado's Eleventh Amendment argument hardly mentions the Compact, the one document that directly

defines the nature and origin of Kansas' claims. *See id.*, at 21-22, 24.

The Compact's plain language leaves no doubt but that Kansas is authorized to enforce both its rights as a State and the rights of its water users. Most explicitly, Article VII-A provides that "[e]ach State shall be subject to the terms of this Compact" and then adds:

> "Where the name of the State or the term 'State' is used in this Compact these shall be construed to include any person or entity of any nature whatsoever using, claiming or in any manner asserting any right to the use of the waters of the Arkansas River under the authority of that State." Art. VII-A, reprinted in the Appendix to the Brief in Support of Kansas' Exception to the Third Report of the Special Master, filed November 24, 2000 ("Kan. Brief") A-10 to A-11.

If Colorado is subject to the Compact's terms, and "Kansas" is construed to include all persons using, claiming, or asserting the right to use waters of the Arkansas River under Kansas' authority, it follows that Kansas may assert the rights of its water users as against Colorado.

If there were any doubt about the import of Article VII-A, moreover, the compacting parties made their intent clear in other provisions of the Compact. For example, in the key provision that Colorado has breached, Article IV-D, the States made the same explicit undertaking to protect the interests of each State's water users. The provision states in part that the waters of the Arkansas River "shall not be materially depleted in usable quantity or availability *for use to the water users* in

Colorado and Kansas under this Compact" by beneficial development or construction occurring after the Compact's execution. Art. IV-D, Kan. Brief A-5 (emphasis added). Thus, the very standard of compliance set by the Compact is defined in terms of detrimental effects on *water users* in Kansas.

Similarly, in Article I-A, the States specified that one of the major purposes of the Compact is to:

> "Settle existing disputes and remove causes of future controversy between the States of Colorado and Kansas, and between citizens of one and citizens of the other State, concerning the waters of the Arkansas River and their control, conservation and utilization for irrigation and other beneficial purposes." Art. I-A, Kan. Brief A-1.

Plainly, the only enforceable means of removing causes of controversy between the citizens of the respective States, short of involving massive classes of individual citizens, is to give effect to Article VII-A's provision that each State represents its citizens.

To the same effect is Article II, which recites that the Compact is based in part on this Court's opinion in *Colorado v. Kansas*, 320 U.S. 383 (1943). Art. II, Kan. Brief A-2. *Colorado v. Kansas*, was, in this Court's words, a suit "between Kansas or her citizens, and Colorado, or her citizens, concerning their respective rights to the beneficial use of the waters of the Arkansas River." 320 U.S., at 384. Colorado sought, and this Court granted, an injunction barring individual water users in Kansas from prosecuting claims against water users in Colorado. *Id.*, at 388-391. Kansas counterclaimed, praying that the Court

"protect and quiet her rights *and those of her citizens and residents*" to water appropriations. *Id.*, at 388-389 (emphasis added). On the premise that Colorado was devoting water to a beneficial use, this Court framed the question presented as "whether, and to what extent, [Colorado's] action injures [Kansas] *and her citizens* by depriving them of a like, or an equally valuable, beneficial use." 320 U.S., at 393 (emphasis added). This Court elaborated that "Kansas is not entitled to relief unless she shows [Colorado's practices] clearly have entailed serious damage to her substantial interests *and those of her citizens.*" *Id.*, at 398 (emphasis added).

Although the Court recognized that Colorado's water use had increased steadily over the past several decades, it found the evidence of injury to Kansas water users insufficient to meet the heavy burden of justifying an injunction against Colorado users. The Court exhorted the States, however, to settle their differences by negotiation and agreement pursuant to the Compact Clause of the Constitution. *Id.*, at 392, 400. The Arkansas River Compact thus arose out of a dispute over whether Kansas and its water users were suffering injury at the hands of Colorado and its water users. And although this Court rebuffed attempts by Kansas water users to intervene in the dispute, the States continued to assert the interests of their respective water users in both this Court and the Compact. It is only natural, then, that the Compact's terms make the interests of each State inclusive of the interests of its water users. Art. VII-A, Kan. Brief A-10 to A-11.

Colorado brushes aside the Compact with the pat contention that its purpose is to settle disputes between

the two States, and between the citizens of the one and the citizens of the other State, but not between the citizens of one State and the other State itself. Colo. Brief 21-22. The Compact is too broad, however, to admit of such a distinction. The Compact expressly provides that the term "State" includes the State's water users. Art. VII-A, Kan. Brief A-10 to A-11. Therefore, to settle disputes between the two States is to settle disputes between one State's water users and the other State.

The Special Master observed that Kansas, as the signatory to the Compact, is the only party that properly can sue to protect the flows of the Arkansas River guaranteed for use by Kansas water users. 2 Third Report, App. 36. Although Colorado strangely questions why the Special Master believed that only Kansas can do so, Colo. Brief 24, it quickly returns to its position that the Eleventh Amendment "prevents individual water users from suing Colorado for damages," *ibid.* What Colorado fails to address, however, is why the compacting States could conceivably have intended to have left themselves without a remedy for the enormous injury to water users that a breach of the Compact could occasion.[1]

This Court said in *Texas v. New Mexico*:

> "A court should provide a remedy if the parties intended to make a contract and the contract's terms provide a sufficiently certain basis for determining both that a breach has in fact occurred and the nature of the remedy called for." 482 U.S. 124, 129 (1987) (citing Restatement

[1] Colorado itself asserts that losses to individual water users "are by far the largest losses." Colo. Brief 38.

> (Second) of Contracts § 33(2), and Comment *b* (1981)).

Here, no one questions that the parties intended to make a contract. No one questions that a breach has in fact occurred. See *Kansas v. Colorado*, 514 U.S. 673 (1995). And, as just summarized, the Arkansas River Compact's plain language, which specifies the intent to protect each State's water users from injury, makes clear that the nature of the remedy called for in this case necessarily accounts for injury to those same water users.

The clear import of the Compact might be understood to establish the propriety of Kansas' suit in either of two ways. By a straightforward reading, the compacting States recognized that each spoke for its water users and would properly represent their interests in subsequent efforts to enforce the Compact. This was the Special Master's reading, which led him to conclude that Kansas has brought a proper interstate action, pure and simple. But if one persisted, as Colorado does, in the view that a damages claim measured in part by losses suffered by individual water users is effectively a personal claim of the individuals themselves, the Compact would equally well be understood as reflecting the compacting States' consent to suit on such "individual claims." A rudiment of Eleventh Amendment jurisprudence is that "a State's sovereign immunity is 'a personal privilege which it may waive at pleasure.' " *College Sav's Bank v. Florida Prepaid Postsecondary Educ. Expense Bd.*, 119 S.Ct. 2219, 2226 (1999) (quoting *Clark v. Barnard*, 108 U.S. 437, 447-448 (1883)). In short, whether Kansas' damages claim is understood as a claim of the State measured in part by losses to its water

users or the claims of its water users presented by Kansas, the Compact plainly establishes that Kansas' suit to recover the amount of those losses is proper.

C. This Court's Eleventh Amendment Decisions Establish Kansas' Right to Bring Suit to Protect Its Sovereign Interests.

The conclusion that the Arkansas River Compact authorizes Kansas' action to enforce its water users' interests is wholly consistent with this Court's interpretation of the Eleventh Amendment. The decision on point is *Texas v. New Mexico*, 482 U.S., at 130-131, in which the Court recognized that money damages may be awarded to remedy a breach of an interstate water compact. The Court unmistakably contemplated precisely the sort of remedy that Kansas seeks here, that is, money damages based at least in part on the harm suffered by individual water users in the plaintiff State, Texas. In reaching that conclusion, the Court addressed possible objections to a money damages remedy. The Court noted:

> "It might be said that *those users who have suffered the water shortages* caused by New Mexico's underdeliveries over the years, rather than the State, should be the recipients of damages, and that they would be difficult if not impossible to identify." *Id.*, at 131-132 (emphasis added).

The Court observed, however, that an in-kind, water remedy "would also likely fail to benefit *all those who were deprived in the past.*" *Id.*, at 132 (emphasis added). Similarly, the Court took note of the suggestion that "a money judgment might find its way into the general coffers of the State, rather than benefit *those who were*

hurt." *Id.*, at 132, n. 7 (emphasis added). It responded, however, that

> "the basis on which Texas was permitted to bring this original action is that enforcement of the Compact was of such general public interest that the sovereign State was a proper plaintiff. See *Maryland v. Louisiana*, 451 U.S. 725, 735-739 (1981). It is wholly consistent with that view that the State should recover any damages that may be awarded, money it would be free to spend in the way it determines is in the public interest." *Texas v. New Mexico*, 482 U.S., at 132, n. 7.

Colorado infers from these passages that Texas could recover damages only for its representation of a general public interest exclusive of the interests of Texas water users. Colo. Brief 23. This Court plainly had a different conception of the "general public interest" in mind, however, when it addressed the need to provide a remedy on account of "those users who have suffered the water shortages," "those who were deprived in the past," and "those who were hurt." Kansas is seeking exactly the sort of remedy that the Court envisioned: A remedy to the State of Kansas measured in part by the injury to those Kansas water users who have suffered the shortages.

Prior decisions further elaborate on the distinction between a proper original action that is of general public interest and an action in which a State invokes this Court's original jurisdiction merely to advance the purely private claims of particular individuals. For example, in *Maryland v. Louisiana*, 451 U.S. 725 (1981), a constitutional

challenge of a state tax on natural gas uses, the Court explained:

> "A State is not permitted to enter a controversy as a nominal party in order to forward the claims of individual citizens. But it may act as the representative of its citizens in original actions where the injury alleged affects the general population of a State in a substantial way." *Id.*, at 737.

The plaintiff States alleged substantial injury to their own proprietary interests as purchasers of natural gas, but they also sought to remedy economic injury to individual citizens, themselves consumers of natural gas. *Id.*, at 737-739. As Colorado notes, the plaintiffs alleged economic injuries of $1.5 million to the States themselves and $120 million to individual citizens. Colo. Brief 18; see *Maryland v. Louisiana*, 451 U.S., at 736, n. 12. This Court observed, however, that the individuals in question were not "a small group of citizens who are likely to challenge the Tax directly," but were a great number of citizens who, due to lack of financial incentive or legal recourse, "cannot be expected to litigate" individually. *Id.*, at 739. The Court concluded, "In such circumstances, exercise of our original jurisdiction is proper." *Ibid.*

Colorado would distinguish *Maryland v. Louisiana*, apparently on the ground that the $120 million sought by the plaintiff States on behalf of individual citizens took the form of tax refunds rather than damages. Colo. Brief 18. A principal purpose of the Eleventh Amendment, however, was to protect against " 'prospective raids on state treasuries.' " *Alden v. Maine*, 119 S.Ct. 2240, 2250 (1999) (quoting D. Currie, The Constitution in Congress:

The Federalist Period 1789-1801, p. 196 (1997)). Inasmuch as a judgment for $120 million has the same effect on a state treasury whether denominated a refund or damages, the distinction is without significance for purposes of the Eleventh Amendment. See *Ford Motor Co. v. Department of Treasury*, 323 U.S. 459, 464 (1945) (holding that action against state for refund of allegedly unconstitutional state tax was "in essence one for the recovery of money from the state"); see also *Edelman v. Jordan*, 415 U.S. 651, 668 (1974) (holding that retroactive award of statutory benefits, although characterized as form of "equitable restitution," was "in practical effect indistinguishable in many aspects from an award of damages against the State").

Colorado also notes that, when judgment was later entered for the plaintiff States, the wrongly collected tax revenues were ordered refunded to the taxpayers individually rather than to the States. Colo. Brief 18 (citing *Maryland v. Louisiana*, 452 U.S. 456, 457 (1981)). This fact actually cuts against Colorado's argument because it underscores that the Court has exercised original jurisdiction over an action on behalf of individual citizens even where it has ultimately directed that the monetary remedy be paid directly to individuals themselves. Here, Kansas seeks merely to recover damages for itself measured in part by the injury to those who were hurt, to be spent in the way that its legislature determines is in the public interest. See *Texas v. New Mexico*, 482 U.S., at 132 & n. 7.

Colorado relies on a series of decisions in which a plaintiff State did assert purely personal claims of specific individuals, acting quite literally as their collecting agent.

For example, in *New Hampshire v. Louisiana*, 108 U.S. 76, 89 (1883), each of the two plaintiff States was "nothing more nor less than a mere collecting agent" for a few identified citizens who owned bonds on which suit was brought. Although the suits were "in the names of the States, they [were] under the actual control of individual citizens, and [were] prosecuted and carried on altogether by and for them." *Ibid.* This Court concluded, "No one can look at the pleadings and testimony in these cases without being satisfied, beyond all doubt, that they were in legal effect commenced and are now being prosecuted by the owners of the bonds and coupons." *Ibid.* Similarly, in *Oklahoma ex rel. Johnson v. Cook*, 304 U.S. 387, 395-396 (1938), the plaintiff State, acting "solely for the benefit of the depositors and creditors" of an insolvent bank, took legal title to private claims against the bank's shareholders as a "mere expedient for the purpose of collection."

And again, in *North Dakota v. Minnesota*, 263 U.S. 365, 375-376 (1923), the decision on which Colorado relies most heavily, a specific group of North Dakota farm owners were funding their State's prosecution of the suit, each individual claimant expected to share in any award of damages "in proportion to the amount of his loss," and the Court deemed the State to be acting on behalf of the claimants "as their trustee against a sister state" because it was "inconceivable that North Dakota [was] prosecuting this damage feature of its suit without intending to pay over what it thus recover[ed] to those entitled."

The Eleventh Amendment bars suits such as these because they are brought by the State in name only; in substance they are suits by individual citizens against a

State. *Alfred L. Snapp & Son v. Puerto Rico, ex rel., Barez*, 458 U.S. 592, 607 (1982). In contrast, Kansas' suit for breach of the Arkansas River Compact is not, as Colorado would have it, a mere "coupling" of private claims with the State's claim; it is not a mere expedient for the purpose of collection. As the Special Master recognized:

> "Of course, this action is no mere contrivance by Kansas to obtain damages for its water users. Rather, it is the State of Kansas that seeks damages, which it contends should be measured in part by the losses suffered by individual farmers." 2 Third Report, App. 21.

The Special Master's determination is amply supported by the nature of the interests, both sovereign and quasi-sovereign, that Kansas alone can petition to enforce.

First, in seeking enforcement of the Compact, Kansas asserts the interests of a "sovereign State." *Texas v. New Mexico*, 482 U.S., at 132, n. 7. Its demand for recognition from other sovereigns is an "easily identified" sovereign interest. *Alfred L. Snapp & Son*, 458 U.S., at 601. The classic example of one State's demand for recognition from another is a border dispute. *Ibid.*; see, *e.g.*, *Rhode Island v. Massachusetts*, 12 Pet. 657, 725 (1838). And just as a State may demand its sister State's recognition of rights in land divided by a border, so Kansas may demand Colorado's recognition of rights in interstate waters. See *Hinderlider v. La Plata River & Cherry Creek Ditch Co.*, 304 U.S. 92, 106 (1938) (States' authority to apportion waters of interstate stream by compact, like their authority to adjust State boundaries by compact, is "a part of the general right of sovereignty") (quoting *Poole v. Fleeger*, 11 Pet. 185, 209 (1837)); *Kansas v. Colorado*, 206 U.S. 46, 97 (1907); see also

Maryland v. Louisiana, 451 U.S. 725, 766 (1981) (Rehnquist, J., dissenting) (observing that boundary disputes and disputes over water rights are examples of "the prototypical original action" involving States' "sovereign interests").

Kansas' sovereign interest in enforcing the Compact is not a private claim of any of its citizens for the simple reason that individual citizens have no such claim. As the Special Master recognized, Kansas is a signatory to the Compact, but its citizens are not. 2 Third Report, App. 36. Indeed, Colorado itself has asserted "that 'Kansas water users do not have a remedy' " and "that there is 'no way' to recover their losses.' " *Id.*, at 33 (quoting Colorado counsel's statements in oral argument); accord Colo. Brief 24 (asserting that individual water users' "claims are barred"). This is a result, moreover, that was reached at Colorado's behest. In the decision that Article II of the Compact cites as one of the bases for the Compact's provisions, this Court enjoined Kansas water users from maintaining suit to protect their interests in the waters of the Arkansas River. *Colorado v. Kansas*, 320 U.S. 383, 388, 391 (1943); see Art. II, Kan. Brief A-2.

Second, even apart from its sovereign interests as a party to the Compact, Kansas has quasi-sovereign interests that support the recovery that it seeks. One of the first decisions to recognize the concept of quasi-sovereignty was *Kansas v. Colorado*, 206 U.S. 46, 99 (1907), in which this Court, in the absence of an interstate compact, exercised original jurisdiction over the claim that Colorado had diverted excessive amounts of water from the Arkansas River. This Court explained:

> "In this respect [Kansas] is in no manner evading the provisions of the 11th Amendment to the Federal Constitution. It is not acting directly and solely for the benefit of any individual citizen to protect his riparian rights. Beyond its property rights it has an interest as a state in this large tract of land bordering on the Arkansas river. Its prosperity affects the general welfare of the state. The controversy rises, therefore, above a mere question of local private right and involves a matter of state interest, and must be considered from that standpoint." *Ibid.* (citing *Georgia v. Tennessee Copper Co.*, 206 U.S. 230 (1907)).

Contrary to Colorado's contention that Kansas' remedy cannot be based on losses to its water users, this Court took into account exactly that sort of evidence – crop yields and levels of water use based on population in areas abutting the Arkansas River – in determining whether Kansas was entitled to relief. 206 U.S., at 108-113.

This Court reached the same result in the Laramie River decisions.[2] This Court held that a State's interests in the apportionment of an interstate stream are "indissolubly linked" with the interests of its water users. 286 U.S., at 509; 259 U.S., at 468. Thus, a State's rights under an equitable apportionment decree are based on the rights of its water users. *Ibid.*; see 309 U.S., at 579-580. Here, the Special Master reasoned that, if the interests of a State's

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[2] *Wyoming v. Colorado*, 259 U.S. 419, modified, 260 U.S. 1 (1922), vacated and new decree entered, 353 U.S. 953 (1957); *Wyoming v. Colorado*, 286 U.S. 494 (1932); *Wyoming v. Colorado*, 298 U.S. 573 (1936); *Wyoming v. Colorado*, 309 U.S. 572 (1940).

water users properly form the basis of a decree apportioning water between two States, so too may they be the measure of a claim for breach of the Compact apportioning water between two States. 2 Third Report, App. 26-27, 36.

Colorado would distinguish the Laramie River decisions on the ground that, although the States' apportionments "were based on use by their respective water users, they were not the *same* as those individual claims." Colo. Brief 23-24 (emphasis in original). In fact, that formulation is an apt description of Kansas' claim for damages in this suit – it is *based* in part on uses foregone or made more expensive to its water users. Kansas' claim is not the *same* as its water users' claims for the simple reason that there are no such individual claims. Kansas, as a signatory to the Compact, is the only party with a claim for breach. Consistent with *Wyoming v. Colorado*, 309 U.S., at 575-576, Kansas seeks a determination only of the relative rights of the two sovereign States. Cf. Colo. Brief 24. Each State should address in-state considerations relating to a damages award – funding of the award in the defendant State, distribution of the award in the plaintiff State – according to its own laws. See *ibid.*; *Texas v. New Mexico*, 482 U.S., at 132, n. 7.

In sum, the Eleventh Amendment is no barrier in this proper original action because Colorado surrendered its immunity to such actions in the plan of the convention, the plain language of the Compact authorizes a remedy based on injury to Kansas' water users, and Kansas' sovereign and quasi-sovereign interests provide an additional basis for that remedy. Colorado's first exception to

the Third Report of the Special Master should therefore be overruled.

II. PREJUDGMENT INTEREST IS AN ESSENTIAL ELEMENT OF COMPLETE COMPENSATION WHETHER OR NOT THE INJURED PARTY'S CLAIM IS LIQUIDATED.

The Special Master recommended that the Court confirm his ruling "that the unliquidated nature of Kansas' claim for damages does not bar the award of prejudgment interest." 1 Third Report 119 (¶ 4). Colorado excepts to this recommendation, relying on what this Court has termed "the venerable common-law rule that prejudgment interest is not awarded on unliquidated claims (those where the precise amount of damages at issue cannot be computed)," *City of Milwaukee v. Cement Division, National Gypsum Co.*, 515 U.S. 189, 197 (1995). See Colo. Brief 25-28.

Colorado acknowledges this Court's observation in *City of Milwaukee* that "the liquidated/unliquidated distinction has faced trenchant criticism for a number of years." 515 U.S., at 197; see Colo. Brief 26. It might have added that in *City of Milwaukee* itself this Court firmly declined to adopt a rule based on the distinction. 515 U.S., at 197. But even while recognizing "a trend in recent years to allow prejudgment interest on unliquidated claims," Colorado contends that the trend has resulted "primarily" from legislative action. Colo. Brief 26. It suggests that when Congress has decided to allow interest on unliquidated claims, it has counterbalanced that remedy with restrictions on liability. *Id.*, at 26-27. It contends that

in this case, in which no statute governs the question, interest should be denied because "there is no time limitation on actions for violation of an interstate compact" and for many years it was difficult for Colorado to detect that it was breaching the Compact. *Id.*, at 27-28.

In fact, Colorado's distinction between statutory and common-law grounds for allowing interest has fared no better than the liquidated/unliquidated distinction. *City of Milwaukee*, in which this Court most recently declined to apply the distinction, was an admiralty case. This Court noted that, in contrast with 28 U.S.C. § 1961, which governs awards of postjudgment interest in most federal court litigation, there is no comparable statute governing the award of prejudgment interest. 515 U.S., at 194. The Court commented:

> "Far from indicating a legislative determination that prejudgment interest should not be awarded, however, the absence of a statute merely indicates that the question is governed by traditional judge-made principles." *Ibid.*

The Court took the same approach in *West Virginia v. United States*, 479 U.S. 305 (1987), where this Court affirmed the award of prejudgment interest against a State as an element of damages for breach of contract:

> " 'In the absence of an applicable federal statute, it is for the federal courts to determine, according to their own criteria, the appropriate measure of damage, expressed in terms of interest, for nonpayment of the amount found to be due.' " *Id.*, at 308-309 (quoting *Royal Indemnity Co. v. United States*, 313 U.S. 289, 296 (1941)).

These decisions contradict Colorado's suggestion that legislative silence is an implicit endorsement of one substantive rule or another regarding prejudgment interest.

Colorado asserts that in *General Motors Corp. v. Devex Corp.*, 461 U.S. 648 (1983), this Court recited the common-law rule against interest on unliquidated damages and "would presumably have followed [that rule] in the absence of a statutory change" in 1946. Colo. Brief 27, n. 7. The *General Motors Corp.* decision itself, however, dispels the notion that this Court, in 1983, would have endorsed the traditional rule:

> "The traditional view, which treated prejudgment interest as a penalty awarded on the basis of the defendant's conduct, has long been criticized on the ground that prejudgment interest represents 'delay damages' and should be awarded as a component of full compensation." 461 U.S., at 655, n. 10.

Indeed, in the wake of *City of Milwaukee*, Colorado's view is even more untenable since the Court has expressly declined "to adopt" such a rule. 515 U.S., at 197.

Moreover, this Court has particular latitude in the exercise of its original jurisdiction to fashion substantive rules bearing on interest. Thus, in *Texas v. New Mexico*, 482 U.S. 124, 132, n. 8 (1987), the Court rejected the defendant State's argument that the Court lacked power to allow postjudgment interest absent statutory authority to do so. Acknowledging the rule of *Pierce v. United States*, 255 U.S. 398, 406 (1921), that postjudgment interest may not be awarded absent statutory authority, this Court ruled that "we are not bound by this rule in exercising our original jurisdiction." 482 U.S., at 132, n. 8.

Inasmuch as federal courts, and in particular this Court in original actions, allow prejudgment interest "according to their own criteria," *West Virginia v. United States*, 479 U.S., at 308, the question raised by Colorado's exception is whether this case presents any reason more compelling than *City of Milwaukee* did for adopting a rule barring interest on unliquidated claims. Colorado has pointed to no such reason.

Colorado asserts its good faith, arguing that it was ignorant that it was breaching the Compact over much of the time that it was underdelivering water to Kansas because depletions to usable Stateline flows were difficult to detect and quantify. Colo. Brief 28. *City of Milwaukee* holds, however, that a defendant's good-faith dispute of its liability has little bearing on whether to award prejudgment interest, because interest is awarded as an element of full compensation, not as a penalty for bad-faith conduct. *City of Milwaukee*, 515 U.S., at 197. Indeed, it was precisely the defendant's plea of good faith that prompted the Court to address the common-law rule barring interest on unliquidated claims – and to affirm its unwillingness to adopt such a rule. *Ibid.*

The Court also made clear that the rationale for its ruling is not confined to admiralty law. It explicitly noted that other cases, including a contract case against a State, have recognized the compensatory purpose of prejudgment interest. *Id.*, at 195, n. 7 (citing, among other cases, *West Virginia v. United States*, 479 U.S. 305, 310-311, n. 2 (1987)). It added that a good-faith dispute as to liability, far from a circumstance so extraordinary as to justify withholding compensation, is common to most litigation:

> "In sum, the existence of a legitimate difference of opinion on the issue of liability is merely a characteristic of most ordinary lawsuits. It is not an extraordinary circumstance that can justify denying prejudgment interest." *Id.*, at 198.

The Court concluded that "uncertainty about the outcome of a case should not preclude an award of interest." *Id.*, at 197; accord *Texas v. New Mexico*, 482 U.S., at 129 (observing that two special masters had recognized that defendant State had acted in good faith, but ruling that "good-faith differences about the scope of contractual undertakings do not relieve either party from performance"); *General Motors Corp. v. Devex Corp.*, 461 U.S. 648, 655, n. 10 (1983) (recognizing criticism of traditional view treating interest "as a penalty awarded on the basis of the defendant's conduct"); *Anadarko Petroleum Corp. v. FERC*, 196 F.3d 1264, 1268 (D.C. Cir. 1999), modified on other grounds, 200 F.3d 867 (D.C. Cir.) (per curiam), cert. denied, 120 S.Ct. 2215 (2000). Colorado has offered no reason why its assertions of good faith should carry more weight in this case than those of the defendants in other recent cases.

Colorado also argues that "there is no time limitation on actions for violation of an interstate compact," suggesting that it is unfair to award interest against a defendant when much time has passed. Colo. Brief 28. Whether in fact there is no such time limitation is debatable, inasmuch as the Court has not ruled out the applicability of laches as just such a limitation. See *Kansas v. Colorado*, 514 U.S. 673, 687-688 (1995). More to the point, however, this Court's decisions certainly do limit prejudgment

interest where the plaintiff is responsible for " 'undue delay in prosecuting the lawsuit.' " *City of Milwaukee*, 515 U.S., at 196 (quoting *General Motors Corp. v. Devex Corp.*, 461 U.S. 648, 657 (1983)); *West Virginia v. United States*, 479 U.S., at 311, n. 3. Thus, this Court's precedents hardly leave an unsuspecting defendant at the mercy of the plaintiff who treats a lawsuit as an investment opportunity. When the plaintiff is not responsible for delay, on the other hand, the passage of time is not a reason to *deny* the plaintiff interest; on the contrary, it is the very reason to *award* interest. *Anadarko Petroleum Corp.*, 196 F.3d at 1268; *In re Milwaukee Cheese Wis., Inc.*, 112 F.3d 845, 849 (7th Cir. 1997); *In re Oil Spill by the Amoco Cadiz*, 954 F.2d 1279, 1331, 1334 (7th Cir. 1992) (per curiam). Here, of course, this Court has concluded that Kansas was not guilty of inexcusable delay in bringing suit. *Kansas v. Colorado*, 514 U.S. 673, 689 (1995).

In sum, the Court found no reason in *City of Milwaukee* to resurrect the distinction between liquidated and unliquidated claims, and Colorado has presented no reason for doing so here.

III. KANSAS' COMPENSATION SHOULD NOT BE WITHHELD ON THE THEORY THAT COLORADO BREACHED THE COMPACT IN GOOD FAITH.

As stated above, the Special Master recommended that the Court confirm his ruling that an award of money damages to Kansas may be based in part on losses incurred by Kansas water users. 1 Third Report 119 (¶ 3). He further recommended that Kansas' damages should

include prejudgment interest, "but only from 1969 to the date of judgment," when Colorado knew or should have known of its breach of the Compact; and Kansas' damages during the period 1950-1968 should be adjusted only for inflation. 1 Third Report 107, 120 (¶ 8); see *id.*, at 103. For the reasons stated in Kansas' Brief in Support of Kansas' Exception to the Third Report of the Special Master, filed November 24, 2000, Kansas believes prejudgment interest should not be limited to the period when Colorado knew or should have known that it was violating the Compact, but should be awarded as necessary to afford Kansas full compensation.

Colorado, however, takes a position more radical than the Special Master's. In excepting to the Special Master's recommendations, it argues both that (1) prejudgment interest should be denied for the period 1950-1984 on account of Colorado's uncertainty over whether it was in breach and (2) Kansas' damages should be further reduced by "some fair percentage" to reflect Colorado's uncertainty. Colo. Brief 37. In short, Colorado's position is that it would be "fundamentally unfair" to compensate Kansas for all of its injury. Colo. Brief 28 (capitalization omitted).

While Colorado's argument is lengthy and elaborate, the entire discussion rests on the proposition that "factors in extenuation" should be considered in determining both the amount of Kansas' damages and whether Kansas should receive any prejudgment interest. *Ibid.* By factors in extenuation, Colorado means its own asserted ignorance of its Compact violations, which it takes pains to show by describing the difficulty of determining the effect of groundwater well pumping on usable stateline

flows. *Id.*, at 28-37. Simply stated, Colorado asserts that it was acting in good faith when it breached the Compact. This Court has previously found that the evidence of Colorado's Compact violations available to Kansas was "vague and conflicting." *Kansas v. Colorado*, 514 U.S. 673, 689 (1995). Colorado invokes this finding to argue that, if the evidence of its breach was too equivocal to hold Kansas guilty of inexcusable delay in bringing suit, then it is likewise too equivocal to hold Colorado liable to compensate Kansas fully for the breach. Colo. Brief 29-30, 37.

Colorado's entire argument is misdirected, however, because its premise is incorrect. Although "factors in extenuation" may be relevant to a punitive remedy, they are not relevant to the question of whether a party should be compensated for its injury. It is telling that Colorado's argument on this point fails to acknowledge this Court's decisions in *Texas v. New Mexico* and *City of Milwaukee*.

In *Texas v. New Mexico*, this Court rejected New Mexico's argument that it should be relieved of the duty to compensate for its failure "to deliver water that it, in good faith, believed it had no obligation to refrain from using." 482 U.S., at 129. The Court in 1987 determined that New Mexico had underdelivered water over the period 1950-1983. *Id.*, at 127-128. Until 1987, however, the parties had remained at odds on the interpretation of New Mexico's obligations under the Pecos River Compact, two special masters had concluded that New Mexico was acting in good faith, and the Court did not take issue with that conclusion. *Id.*, at 129. Nevertheless, the Court firmly held that New Mexico could not escape liability for its past failures to perform under the Pecos

River Compact because "good-faith differences about the scope of contractual undertakings do not relieve either party from performance." *Id.*, at 129.[3]

In *City of Milwaukee*, this Court likewise rejected the defendant's contention that its good faith should relieve it of the duty to pay prejudgment interest. 515 U.S., at 196-197. The reason is that a defendant's good faith is not a consideration relevant to the allowance of compensation, relevant though it might be to the issue of whether to impose a penalty. *Id.*, at 197; see also *General Motors Corp. v. Devex Corp.*, 461 U.S. 648, 655, n. 10 (1983).

The authority on which Colorado principally relies is *Wyoming v. Colorado*, 309 U.S. 572 (1940), a case in which Colorado had violated an interstate water delivery obligation. That case actually undermines Colorado's contention that its claims in extenuation should be considered here. See Colo. Brief 28-29. At issue in *Wyoming v. Colorado*, was whether Colorado should be adjudged in contempt of this Court's decree equitably apportioning the waters of the Laramie River. The Court concluded that

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[3] Colorado seeks to distinguish the facts of *Texas v. New Mexico* in its Summary of Argument, Colo. Brief 7, although, once having made the effort, it studiously avoids the subject in the argument itself. In light of this Court's 1987 opinion in *Texas v. New Mexico*, however, there are no material distinctions to be drawn. The very premise of the Court's holding that good faith does not relieve a party from performance is the factual proposition that New Mexico had indeed acted in good faith over an extended period of time. 482 U.S., at 127-129. Colorado's attempt to draw gradations of good faith misses the essential point that the defendant's state of mind is not relevant to the determination of whether the injured party should receive full compensation.

Colorado should not be adjudged in contempt because Wyoming arguably had acquiesced in Colorado's diversion of more than its share of the river, creating "a period of uncertainty and room for misunderstanding which may be considered in extenuation." 309 U.S., at 582. Colorado's claim in extenuation was properly considered, however, not because a judgment holding it in contempt would have been compensatory to Wyoming, but precisely because it would not, as described below. See *id.*, at 581-582.

This Court has recognized a distinction between a contempt citation that is remedial (or civil) in nature and one that is punitive (or criminal): " 'If it is for civil contempt the punishment is remedial, and for the benefit of the complainant. But if it is for criminal contempt the sentence is punitive, to vindicate the authority of the court.' " *Hicks ex rel. Feiock v. Feiock*, 485 U.S. 624, 631 (1988) (quoting *Gompers v. Bucks Stove & Range Co.*, 221 U.S. 418, 441 (1911)). Because the purpose of a remedial contempt citation is to coerce compliance or "to compensate for losses or damages sustained by reason of noncompliance," the defendant's state of mind is not at issue. *McComb v. Jacksonville Paper Co.*, 336 U.S. 187, 191 (1949) ("The absence of wilfulness does not relieve from civil contempt. . . . Since the purpose is remedial, it matters not with what intent the defendant did the prohibited act"). In contrast, the defendant's state of mind is relevant in the case of criminal contempt. *United States v. United Mine Workers of Am.*, 330 U.S. 258, 303 (1947) ("In imposing a fine for criminal contempt, the trial judge may properly take into consideration the extent of the willful and deliberate defiance of the court's order . . . ").

The Court has cautioned that "[c]ontempts are neither wholly civil nor altogether criminal," but may " 'partake of the characteristics of both.' " *Gompers*, 221 U.S., at 441 (quoting *Bessette v. W.B. Conkey Co.*, 194 U.S. 324, 329 (1904)). It is clear, however, that a contempt adjudication for violation of a decree like the one in *Wyoming v. Colorado* is not primarily remedial or compensatory in nature. The Court observed in *Wyoming v. Colorado* that the issue of whether the plaintiff State has been injured by a violation of the Court's decree is irrelevant to whether the defendant State should be adjudged in contempt. 309 U.S., at 581 ("*After great consideration*, this Court fixed the amount of water from the Laramie river . . . to which Colorado was entitled. . . . *Colorado is bound by the decree* . . . and is not entitled to raise any question as to injury to Wyoming . . . ") (emphasis added); see also *Nebraska v. Wyoming*, 507 U.S. 584, 592 (1993) (plaintiff State seeking enforcement of decree of equitable apportionment "need not show injury").

Thus, when a finding of contempt depends on the defendant's willful and deliberate defiance of the Court's authority, it is only logical to take account of an extenuating circumstance, such as the defendant's "uncertainty" and "misunderstanding." *Wyoming v. Colorado*, 309 U.S., at 582. But when the matter at hand is compensation, the defendant's innocent intentions are irrelevant, as is its plea that it acted in good faith. *McComb*, 336 U.S., at 191; accord *City of Milwaukee*, 515 U.S., at 197; *Texas v. New Mexico*, 482 U.S., at 129.

Colorado cites one additional case, *Talbot v. Seeman*, 1 Cranch 1, 44 (1801), in support of its contention that the

Court should reduce Kansas' damages "by some fair percentage" on account of Colorado's ignorance of its breach. Colo. Brief 37. In *Talbot*, the United States ship of war the Constitution recaptured the Amelia, a vessel owned by a citizen of Hamburg, from French captors. Captain Talbot, who was in command of the Constitution, brought suit for condemnation of the Amelia or for payment of salvage upon restoration to its owner. *Talbot*, 1 Cranch, at 27. Salvage was "a compensation for actual service rendered to the property charged with it" and was "demandable of right for vessels saved from pirates, or from the enemy." *Id.*, at 28. The circuit court ordered the Amelia restored to its owner without payment of salvage on the grounds that Hamburg was not at war with France and that the captain and crew of the Constitution thus did not perform any compensable service by recapturing a vessel from a neutral power. *Id.*, at 3-4, 27. This Court reversed, holding that the Amelia was recaptured from the French, who were in a state of partial war with the United States, and that salvage in the amount of one-sixth of the value of the vessel and its cargo should therefore be paid. *Id.*, at 44.

It is unclear what significance Colorado attributes to the decision in *Talbot*. This Court did not, as Colorado apparently would have it, reduce the compensation payable to the plaintiff in response to a claim of extenuation. On the contrary, the Court, in reversing a denial of salvage, directed that Captain Talbot and his crew should indeed be compensated for the services that they had rendered. *Id.*, at 44-45. In determining the amount of salvage to be paid, the Court did not opine that full compensation "is fundamentally unfair," Colo. Brief 28,

but that, in the absence of an applicable statute, one-sixth of the value of the vessel and its cargo was a just estimate of full compensation on account of "the danger from which the recaptured was saved, and of the risk attending the retaking of the vessel." *Talbot*, 1 Cranch, at 44.[4]

In sum, none of the cases cited by Colorado is authority for its contention that its claim of extenuation should be considered in determining an adequate remedy for its breach of the Compact. In the absence of such authority, this Court should not afford Kansas less than full compensation.

IV. KANSAS SHOULD BE ALLOWED PREJUDGMENT INTEREST AT RATES ADEQUATE TO COMPENSATE IT FOR ITS LOSS.

The Special Master recommended that Kansas' damages should include prejudgment interest at the rates proposed by Kansas. 1 Third Report 107, 120 (¶ 8). As the Special Master recognized, one of the determinants of an interest rate is opportunity cost, which represents the foregone "opportunity to invest and earn from" funds

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[4] The award of compensation was not necessarily identical to what the Court might have awarded had a statute applied. One statute, applicable to salvage payable upon recapture of an American vessel from an enemy, specified that an award of salvage should be set at between one-eighth and one-half of the value of the vessel and its cargo. *Id.*, at 30, 43. This Court in no way suggested, however, that the compensation payable to Captain Talbot and his crew was being reduced "by some fair percentage," Colo. Brief 37, or that one-sixth of the value of the Amelia and her cargo was anything less than full compensation for the services rendered.

withheld. *Id.*, at 91. Kansas' economists proposed two sets of interest rates: one used to calculate interest on losses to water users, reflecting a relatively high opportunity cost to farmers and other individual water users; and another used to calculate interest on tax losses to the State of Kansas, reflecting the State's lower opportunity cost. See *id.*, at 94. The Special Master noted that Kansas' economists had "carefully developed" the proposed rates, and that Colorado had offered no evidence at all to controvert them. *Id.*, at 91. Indeed, Colorado's response to Kansas' proposed interest rates has been limited to argument of counsel in post-trial briefing.

Colorado excepts to the Special Master's recommendation on the ground that any prejudgment interest awarded to Kansas should be calculated on the basis of the State's lower opportunity cost rather than the opportunity cost actually incurred by its water users. Colo. Brief 38-41. Colorado's rationale is a reprise of its Eleventh Amendment argument. It reiterates that Kansas does not legitimately represent the interests of its water users, such that affording Kansas a recovery based in part on losses to its water users is tantamount to allowing Kansas "simply [to] advanc[e] individuals' claims." *Id.*, at 39-40. While acknowledging that Kansas' water users did indeed incur a higher opportunity cost on the foregone use of funds owed as damages, Colorado nevertheless argues that to provide a remedy for that higher cost would be "punitive and unfair to Colorado." *Id.*, at 39.

The answer to Colorado's Eleventh Amendment argument remains the same. The Arkansas River Compact makes clear that Kansas does properly represent the interests of its water users, inasmuch as the term "State"

expressly includes the State's water users. Art. VII-A, Kan. Brief A-10 to A-11; see Point I.B, *supra*. The decision in point, *Texas v. New Mexico*, likewise confirms that a State's action to enforce the interests of "those users who have suffered the water shortages," or "those who were hurt," is "of such general public interest that the sovereign State [is] a proper plaintiff." 482 U.S., at 131-132 & n. 7.

Colorado points out, however, that, in accordance with *Texas v. New Mexico*, 482 U.S., at 132, n. 7, the State of Kansas rather than its individual water users should recover any damages that may be awarded, to be spent as it determines is in the public interest. Colo. Brief 39. Colorado perceives an inconsistency in allowing a recovery to the State that is based to any extent on losses to water users. *Ibid.* The inconsistency disappears, however, when one recognizes that Kansas receives a remedy, just as it brought this action, as a representative of a general public interest that is sufficiently broad to embrace the interests of its water users. See *Texas v. New Mexico*, 482 U.S., at 131-132 & n. 7.

In another variation on the theme, Colorado protests that, had it tendered a damages payment to Kansas at some earlier point in this litigation, the tendered monies would have accrued interest at rates applicable to the State rather than to individual water users. Colo. Brief 40-41. It contends that awarding interest at the rates at which water users actually lost use of the monies withheld "is punitive rather than compensatory." *Id.*, at 41. But Colorado's hypothetical scenario takes for granted that Kansas would retain the tendered monies in the state treasury rather than distributing it to those users who

had suffered the water shortages. Had Kansas had the opportunity to take the latter course (which it surely could determine was in the public interest, see *Texas v. New Mexico*, 482 U.S., at 132, n. 7), it could have averted the harm to its water users, in the form of lost use of funds, for which Colorado now seeks to escape liability. Under such a scenario, interest would have accrued at the very rates Kansas has proposed.

Colorado similarly asserts that it did not earn interest at individual water users' rates on money that will be used to pay damages. Colo. Brief 41. It neglects to acknowledge, however, that its own water users did indeed accrue high rates of income from their use of water that properly belonged to Kansas. The Special Master excluded from evidence Kansas' estimate of the benefits that Colorado and its water users realized as a result of breaching the Compact. 1 Third Report 2-3. He noted, however, that "we should not be oblivious to Colorado's use of the water over this long period of years." *Id.*, at 101. The Special Master's concern was well-founded. Colorado and its water users are subject to the terms of the Compact, as are Kansas and its water users. Art. VII-A, Kan. Brief A-10 to A-11. Thus, it is hardly punitive to expect Colorado to make Kansas and its water users whole, especially in view of the substantial profits that Colorado and its water users have derived from their breach of the Compact. See, *e.g.*, *General Motors Corp. v. Devex Corp.*, 461 U.S. 648, 655 n. 10 (1983) ("A rule denying prejudgment interest not only undercompensates the [plaintiff] but also may grant a windfall to the [defendant] and create an incentive to prolong litigation"); *In re Oil Spill by the Amoco Cadiz*, 954 F.2d 1279, 1332 (7th Cir. 1992) (per curiam) ("An injurer allowed to keep the return on this money has profited by the wrong").

V. THE MASTER'S RECOMMENDATION ON CROP LOSSES IS REASONABLE AND SHOULD BE ACCEPTED.

Colorado's fourth and last exception challenges the Special Master's reliance on the "crop yield-evapotranspiration relationships used by the Kansas experts." Colorado Exceptions 2 (¶ 4). Colorado's argument in support of the exception, however, addresses the Kansas crop yield-evapotranspiration relationships only obliquely. Stating that it "will not trouble the Court to review the testimony on the technical issues," Colo. Brief 44, Colorado argues that the values reached in that analysis are simply too high when compared with the low cost of obtaining groundwater and with other values for water obtained from a literature review. *Id.*, at 41-49. Additionally, Colorado challenges the Special Master's reference to a value determined by a Colorado expert that was higher than the Kansas values. *Id.*, at 47-48. Colorado concludes that the Special Master's crop loss values are "unreasonable and inequitable." *Id.*, at 49.

There are, in fact, as discussed below, a number of good reasons why the Special Master reached the conclusions that he did. In essence, Colorado is arguing that the number of new large capacity wells installed over the period 1950-1977 in the canal service areas in Kansas should have been more than the 336 such wells actually installed if the value of crop losses were as high as the Kansas experts and the Special Master determined. Yet

Colorado introduced no evidence to that effect. Colorado has simply argued the point without any basis in the evidence. For instance, Colorado did not even attempt to analyze how many wells should have been drilled under its theory. And the Colorado literature review compared the Kansas values to values derived in other studies that the Colorado expert himself admitted were *not comparable*, making the comparison essentially worthless. Additionally, the value of water separately determined by a Colorado expert and referenced by the Special Master was developed for purposes of this case and was considered, if anything, too low in relation to what could be expected in the Arkansas River Basin.

A. Kansas' Evidence on Crop Losses

Three experts testified for Kansas on crop losses. Each expert is eminent in his field. Professor Norman Whittlesey is a recently retired professor of agricultural economics with more than 30 years in that position and a fellow of the American Agricultural Economics Association. His qualifications are further summarized by the Special Master. See 1 Third Report 14-15, n. 2. Eugene Franzoy is an agricultural engineer with many years of field experience in the very area of concern, crop yield response to water consumed by the crop. *Id.*, at 57 & n. 14; Second Report of Special Master, *Kansas v. Colorado*, No. 105, Orig., 24 (1997). On rebuttal, in response to Colorado's criticisms, Kansas called Professor Loyd Stone of Kansas State University. Professor Stone's significant qualifications are summarized by the Special Master. 1 Third Report 50, n. 11, 56. Professor Stone was described by one Colorado expert as "a prominent soil scientist."

Colo. Exh. 1085, at 10. Research by Professor Stone was relied upon by Professor Whittlesey in developing the crop yield-evapotranspiration (ET) relationships applicable to this case.

In the preparation of the economic analysis, Professor Whittlesey made a number of visits to the Arkansas River Valley in Kansas and conducted telephone interviews with farmers there. He determined through interviews with farmers that the crops in the surface-water-only areas were alfalfa, winter wheat and grain sorghum. Colorado did not disagree with this determination. 1 Third Report 46. The States agreed to the amount of consumptive use by the crops, known as ET, for each year of violation by Colorado. *Id.*, at 7-9, 46; 2 Third Report, App. 86, col. v.

It is widely accepted that once the amount of evapotranspiration by a crop is known, the yield can be determined according to a linear relationship of the form y=mx+b, where "y" is the yield and "x" is the amount of water taken up, *i.e.*, consumed, by the crop (ET). The "b" factor is not relevant for incremental determinations of yield response to water. The slope "m" of the straight line represented by this equation is the coefficient that relates additional water consumed by the crop to additional crop yield. The Kansas experts cited and discussed no less than 16 texts and peer-reviewed articles in professional journals supporting the linearity of the relationship between crop yield and ET. 1 Third Report 47. The Kansas experts also relied on personal research and field experience that confirmed the linearity of the relationship and the coefficient of relationship between ET and crop yield for each crop. Even Colorado's expert admitted that the

linear relationship "has 'long been understood.' " *Ibid.* And as the Special Master explained, the exact coefficient of relationship between yield and ET, the slope "m" of the linear relationship, was carefully chosen for each crop to reflect field conditions. See 1 Third Report 49-52, 56.

B. Colorado's Evidence on Crop Losses

Two Colorado experts attempted to directly refute the Kansas analysis. These were Associate Professor Dennis Wichelns who had recently become a tenured professor of agricultural economics, see 1 Third Report 15, n. 3, and Grant Cardon, a relatively new associate professor, see *id.*, at 55 & n. 13. A third Colorado expert, Richard Adams, has been a full professor of agricultural economics for a number of years. *Id.*, at 62 & n. 16. A fourth Colorado expert, James Lochhead, was formerly Director of the Colorado Natural Resources Department. *Id.*, at 63-64, 108, n. 29.

Colorado sought to challenge the Kansas evidence on crop losses on a number of different legal and factual grounds. Colorado asserted that Kansas should have drilled even more wells than had been drilled in order to mitigate the damages that were being sought from Colorado. The Colorado evidence on mitigation was excluded by the Special Master. 2 Third Report, App., 68-75. Professor Wichelns, in connection with his mitigation analysis, asserted that more wells should have been drilled if the value of the crop losses was as high as indicated by the Kansas evidence. Professor Adams also supported this view.

Colorado's primary challenge to the Kansas evidence was Professor Wichelns' development of a series of non-linear equations to describe the yield-ET relationship. He decided, however, to withdraw his non-linear analysis in the middle of cross-examination on the basis that his "data were 'not reliable' for the purposes for which he had used them." 1 Third Report 53-54. He had, as described by the Special Master, failed to realize the fundamental error of using data that were clearly unsuited for the use he was attempting to make of them. *Ibid.* That is, Professor Wichelns had attempted to create a non-linear relationship between crop yield and ET on the basis of data from experiments where more water was put on the crop than the crop could use. He then attempted to apply non-linear equations that he had developed from the excess-water data to the water-deficit conditions of the Arkansas River Valley in Kansas. See *id.*, at 53-55. This was done despite the fact that he was fully aware of the water-deficit situation there. The States had previously stipulated, as a basis for the work of the economists, that there were water shortages in Kansas every year even aside from Colorado's Compact violations. *Id.*, at 46; 2 Third Report, App. 86, col. k. Indeed, Colorado counsel state in the current briefing that the surface-water-only lands "were not just occasionally short of water, they were water short every year." Colo. Brief 47, n. 14. It was therefore surprising that Professor Wichelns would attempt to apply equations based on excess-water data to the Arkansas River Valley in Kansas.

In the wake of the withdrawal of his primary analysis using non-linear equations, Professor Wichelns, over

Kansas' objection, expressed a number of new opinions that were not included in his original expert report. 1 Third Report at 59. These opinions purported to raise questions about the validity of the regression analyses used by researchers in the peer-reviewed literature to determine the linear relationship between crop yield and ET. The Special Master described these supplemental opinions as highly technical, but "substantively refuted by Professor Stone." *Ibid.* Colorado incorrectly suggests that the summary dismissal of the supplemental opinions was indicative of the Special Master's analysis of all of Colorado's objections. See Colo. Brief 44. In fact, the Special Master fully explained in his Third Report the careful consideration given to all of Colorado's substantive objections to the Kansas evidence. 1 Third Report 45-64.

Professor Adams limited himself to providing a literature search for studies of water values that could be compared to the value derived from the Kansas analysis. He provided an extremely short report, Colo. Exh. 1203. See Colo. Brief A-28 to A-39. Unfortunately, none of the studies that he located in his literature search turned out to be comparable to the values in the Kansas analysis. He agreed on cross-examination that comparable values would be higher than the values analyzed in his report.[5]

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[5] Water values differ depending on what development costs are accounted for. There are three "time horizon" categories recognized by agricultural economists, namely, long run, short run, and short-short run (intraseasonal). Professor Adams admitted that the Kansas values in this case are short-short run values. 1 Third Report 63. The studies reviewed by Professor Adams were either long run or short run values and

Moreover, Professor Adams stated that the values he had found in the literature did not represent sales of water, that he was not "using real world exchanges of money for water," and that he was using "mostly computer studies" for comparison. RT Vol. 200 at 81-84 (A-3 to A-6, *infra*).

C. The Special Master's Analysis of the Evidence on Crop Losses

The Special Master carefully described the evidence presented by both States on crop losses and fully explained his reasoning in resolving the evidentiary issues. 1 Third Report 45-61. The Special Master recognized the benefits of the agreement that the States had been able to reach on underlying factual issues. The parties were in agreement for each year 1950-1994 on the amount of consumptive use by the crops (ET) that would have occurred but for Colorado's Compact violations, the crop mixes, the crop prices, and the crop water deficits. *Id.*, at 46.

The Special Master then reviewed the evidence on the linearity of the relationship between crop yield and ET, analyzing the equation and the values used in the equation for each of the three crops, namely, alfalfa, winter wheat and grain sorghum. He noted that the value of the slope of that relationship for each crop was adjusted to make it applicable to field conditions. He reviewed

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therefore not comparable to the values that are relevant in this case. *Ibid.* Long run values are lower than short run values, and short run values are lower than short-short run values. See Kan. Exh. 1070 (A-8, *infra*); RT Vol. 203 at 103-108 (Prof. Whittlesey) (A-20 to A-26, *infra*).

Colorado's alternate approach using non-linear equations, which was ultimately withdrawn. He also analyzed in detail the Colorado objections to the Kansas analysis, pointing out the indicia of reliability associated with the Kansas analysis and the lack of foundation for the claim by Colorado that the otherwise linear relationship becomes non-linear under field conditions. *Id.*, at 56 (noting that neither Colorado expert could cite a single journal article to support Colorado's position). He also considered other objections to the linearity of the relationship. *Id.*, at 57-59.

Most importantly for the objections that Colorado continues to press at this stage of the proceedings, the Special Master analyzed the argument by the Colorado experts that more wells should have been drilled if the crop loss values were as high as the Kansas analysis showed. The Master, relying on testimony responding to the Colorado position by Professor Peter Barry, Kansas' "preeminent" expert on agricultural finance, 1 Third Report 40-41 & n. 8, pointed to a number of reasons, unrelated to crop values, why such wells would not have been drilled, *id.*, at 60-61, drawing into question the validity of the Colorado comparison of groundwater costs and crop losses.

The Special Master also addressed the claim by Professor Adams that his literature review had shown the Kansas values to be too high. Of great significance to the Special Master's analysis, and properly so, was Professor Adams' acknowledgment on cross-examination "that the literature values he reported were not 'comparable to the values that are relevant in this case.' " *Id.*, at 63. Colorado challenges the Special Master's statement by asserting

that Professor Adams testified "that whether the 'intraseasonal' values would be higher was an empirical question. RT. Vol. 200 at 121-122 (Colo. App., Item No. 5)." Colo. Brief 47 (footnote omitted). Colorado fails to point out, however, that when Professor Adams returned to the stand on sur-rebuttal, he clarified that "conceptually I would agree that the intraseasonal would be higher than the short run, which would be high r than the long run," but that he didn't know how much higher. RT Vol. 208 at 98-99 (A-10 to A-11, *infra*).

Colorado also asserts that the comparison by Professor Adams was appropriate because the studies in the literature that he had found "were based on well water, which would be higher than the value of *unregulated* surface water in Kansas." Colo. Brief 47 (emphasis added). First, Professor Adams was uncertain of the extent to which the studies he had found involved groundwater. See Colo. Brief A-79. Second, the surface water in Kansas is highly regulated through storage in John Martin Reservoir and release to the Kansas canals on demand. 1 First Report of Special Master, *Kansas v. Colorado*, No. 104, Orig., 45-47. The lead Kansas economist, Professor Whittlesey, also testified that the values that Professor Adams sought to compare to the Kansas values were not comparable and would be expected to be lower than the Kansas values. RT Vol. 203 at 103-108 (A-20 to A-26, *infra*).

The Special Master also considered a value for water that was determined by the Colorado expert James Lochhead on the basis of a land-fallowing project in the Palo Verde Irrigation District in California, which was conducted to provide water to the Metropolitan Water

District of California. The value as determined by Mr. Lochhead was higher than the Kansas value. Moreover, Mr. Lochhead confirmed a memorandum that he had written for purposes of this case in which he had identified the higher value and commented that even it might not be as high as one would expect in the Arkansas Basin: "Assuming similar program costs, the cost of water in the Arkansas Basin may be higher, since growing season and annual consumptive use per acre are less." RT. Vol. 211, at 95-96 (A-25 to A-26, *infra*). Mr. Lochhead's analysis was based on an actual sale of water; it was a real world exchange of money for water.

Colorado criticizes the Special Master's reliance on Mr. Lochhead's analysis, contending that the price involved was for municipal rather than agricultural use. Colo. Brief 47-48. As support for this allegation, Colorado cites the testimony of Professor Adams which is reprinted in the Appendix to the Colorado Brief. A review of that transcript, however, reveals that there is no support for Colorado's distinction between water uses. The transcript does not even mention the transaction referred to in the text of the Colorado Brief.[6] Indeed, Professor Adams

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[6] The cited testimony includes Professor Adams' acknowledgment that his values were not comparable to the Kansas values and a discussion of a different report of actual transactions introduced by Kansas that Professor Adams had not considered in his analysis and that the Kansas expert, Professor Whittlesey, had indicated would be comparable. The value shown under those conditions per acre-foot was $100-$175, versus the value of $109 per acre-foot in the Kansas analysis. See Colo. Brief A-72 to A-76. In this regard, it is significant that Professor Adams withdrew from consideration one of the principal reports on which he was relying, which he himself had authored. He withdrew it on cross-examination, admitting that it contained errors. See RT Vol. 208 at 99-106 (A-11 to A-18, *infra*).

never testified on the transaction for which Colorado cites his testimony.

In sum, the Special Master thoroughly addressed each of the Colorado criticisms of the work of the Kansas experts. In each instance, he found the Colorado criticisms unfounded and unpersuasive. Colorado's current attempt to resurrect some of those criticisms is similarly unavailing. On the basis of the Special Master's thorough and well-explained analysis of the agricultural, engineering and economic testimony on crop losses, the Court should approve the Special Master's recommendation on crop losses and overrule Colorado's exception.

CONCLUSION

The Exceptions of the State of Colorado to the Third Report of the Special Master should be overruled.

Respectfully submitted,

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Appendix Item 1

Excerpt from
RT Vol. 200
December 21, 1999
Direct Examination of Richard M. Adams

Direct Examination of Richard M. Adams
[RT Vol 200, Pages 81-84]

81

NOW, I ALSO LOOKED AT – AS I MENTIONED, I LOOKED AT OTHER STUDIES BESIDES THE ONES REPORTED HERE, AND THOSE ARE DISCUSSED IN THE TEXT OF MY REPORT WHERE I MENTION SOME STUDIES THAT HAVE LOOKED AT, FOR EXAMPLE, LEASING OF WATER INTRASEASONALLY.

ONE OF THE STUDIES WE WERE DOING IN THE DESCHUTES RIVER BASIN – AS A PART OF THAT STUDY, ONE OF MY COLLEAGUES LOOKED AT HOW MUCH WE COULD LEASE WATER FROM FARMERS WHO GREW SOMEWHAT LOW-VALUE CROPS. AND THIS WOULD BE COMPARABLE TO THE RENTING THE WATER FROM THEM WITHIN A SEASON, WHICH IS SOMEWHAT COMPARABLE TO A SITUATION WHERE FARMERS MAY HAVE THE CROPS IN THE GROUND BUT THEN THEY'RE OFFERED THE OPPORTUNITY TO LEASE IT. SO THEY RENT THEIR WATER OUT.

AND IN THOSE STUDIES THEY FOUND – AND I SHOULD ACTUALLY SAY THESE ARE MODELS. THEY'RE NOT ACTUAL SITES, BUT THE MODEL EXERCISED SUGGESTED THAT SUBSTANTIAL AMOUNTS OF WATER COULD BE AVAILABLE FROM FARMERS AT $30.00 AN ACRE FOOT, MEANING THEY WOULD HAVE AN INCENTIVE TO GIVE UP THEIR WATER AND TAKE THAT MONEY AND FORGET

ABOUT FARMING IN THAT PARTICULAR YEAR.

SPECIAL MASTER: DO ANY OF THE STUDIES THAT YOU HAVE ON TABLE 1 REPRESENT SALES OF WATER?

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THE WITNESS: NO, THEY DO NOT, YOUR HONOR, AND THAT'S A VERY GOOD POINT. WHAT WE'RE TALKING ABOUT IN THESE TABLES ARE ECONOMISTS' ESTIMATES, USING THOSE TECHNIQUES THAT I DESCRIBED EARLIER WHERE ECONOMISTS TRY TO IMPUTE OR IMPLY A VALUE. AND IT'S THE SAME THING THAT'S BEING DONE IN THIS CASE. WE'RE NOT USING REAL WORLD EXCHANGES OF MONEY FOR WATER IN THAT SENSE.

BUT THERE IS EVIDENCE ON WHAT PEOPLE ARE WILLING TO PAY FOR WATER IN SIMILAR SITUATIONS SUCH AS THIS. AND THAT IS RELATED TO MY SECOND LINE OF INQUIRY IN TERMS OF COMMON SENSE AND WHAT THE REAL WORLD, PERHAPS, MIGHT SUGGEST IS A REASONABLE VALUE FOR THIS AREA.

SPECIAL MASTER: BEFORE WE LEAVE YOUR FIRST LINE OF REASONING HERE, CAN YOU TELL ME HOW ANY OF THESE STUDIES WERE DONE, THE WHEAT STUDY OR THE SORGHUM ONE OR THE ALFALFA ONE?

THE WITNESS: YES. THESE ARE DONE PRIMARILY WITH TWO DIFFERENT TECHNIQUES. THE WHEAT ONE, FOR EXAMPLE, WAS DONE WITH ONE OF THESE LINEAR PROGRAMMING TYPE OF MODELS

IN WHICH THEY CONSTRUCT A MODEL, IF YOU WILL, OF FARMING IN THE REGION, AND IN THAT MODEL THEY INCLUDE THE CROPS THAT COULD BE GROWN, THE YIELDS THAT COULD BE REALIZED, THE AMOUNT OF WATER AVAILABLE.

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THE WAY THE ECONOMISTS THEN USE THE MODEL IS TO SEE WHAT HAPPENS AS WE PRICE WATER AT DIFFERENT LEVELS AND WHICH CROPS FALL OUT. SO WHEN THE CROP FALLS OUT, MEANING IT'S NO LONGER PRODUCED IN THE MODEL, IT MEANS THAT THAT CROP CAN NO LONGER AFFORD TO PAY FOR THAT WATER. THE FARMER WOULD NOT GROW THAT CROP AS THE PRICE OF WATER IS INCREASED. AND THAT'S A FAIRLY COMMON TECHNIQUE. IN FACT, I THINK THE BULK OF THESE STUDIES FALL WITHIN THAT GENERAL HEADING OF USING VARIOUS FORMS OF LINEAR PROGRAMMING.

THERE ARE EARLIER STUDIES – AND I'M NOT SURE IF ANY OF THESE ARE OF THAT NATURE – THAT WOULD HAVE USED SIMPLE BUDGETING. THEY WOULD SAY A CROP GENERATES $200 IN REVENUE, AND IT GENERATES $30.00 IN PROFIT, AND IT TOOK TWO ACRE FEET OF WATER TO GROW THE CROP. THEREFORE, THE RETURNS TO THE WATER MIGHT BE $15.00 AN ACRE FOOT.

BUT MOST OF THESE STUDIES – AND I WOULD HAVE TO GO BACK AND [LOOK] AT THEM AGAIN – AND I DO HAVE THEM ALL AVAILABLE. BUT IF I RECALL, THE BULK OF THESE ARE LINEAR PROGRAMMING TYPE STUDIES.

SPECIAL MASTER: WELL, LET ME SEE IF I CAN PUT THIS IN LAWYER KIND OF LANGUAGE. IS IT AS SIMPLE AS SAYING, THEN, THAT THESE STUDIES REPRESENT I GUESS, MOSTLY COMPUTER STUDIES, BUT

STUDIES, ANYWAY, WHERE THE AUTHOR IS LOOKING AT THE POINT AT WHICH WATER IS SIMPLY TOO EXPENSIVE AND YOU WOULDN'T FARM IF YOU HAD TO PAY MORE THAN SOME FIGURE FOR WATER?

THE WITNESS: I THINK THAT'S A VERY GOOD WAY OF PUTTING IT, YOUR HONOR. WHAT WE FIND IS THAT THE LOW-VALUE CROPS DROP OUT FIRST. SO IF WE WERE MODELING A FARMER'S BEHAVIOR – JUST ONE FARMER – AND THIS FARMER COULD GROW ANYTHING FROM AVOCADOS TO WHEAT – AND WE KNOW THAT AVOCADOS OR CARROTS ARE A HIGH-VALUE CROP – THE NORMAL ECONOMIC REACTION WOULD BE AS WATER GOES UP IN PRICE, I'M GOING TO STOP GROWING THE WHEAT BECAUSE I CANNOT MAKE ANY MONEY GROWING WHEAT AT THAT PRICE. BUT I WOULD CONTINUE TO GROW SUGARBEETS, AND IF WATER GOT MORE EXPENSIVE AND I STOPPED GROWING SUGARBEETS, THEN I WOULD ONLY GROW COTTON. AND IF THAT WATER GOT PROGRESSIVELY MORE EXPENSIVE, THEN I WOULD HOPE TO BE ABLE TO GROW AVOCADOS OR ORANGES IF I HAD A CLIMATE THAT WOULD ALLOW THAT. BUT THAT'S THE GENERAL LOGIC THAT APPLIES HERE, AS YOU HAVE CORRECTLY STATED.

* * *

Appendix Item 2

Kansas Exhibit 1070

KANSAS EXHIBIT 1070

Time Horizon	Definition	Value of Water
Long Run	Net of development & crop production costs	Lowest
Short Run	Net only of variable costs of production	Middle
Short/Short Run	Net of marginal irrigation and harvest costs	Highest

Appendix Item 3

Excerpt from
RT Vol. 208
January 20, 2000
Cross Examination of Richard M. Adams

Cross Examination of Richard M. Adams
RT Vol. 208 at 98-106

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* * *

Q. IT'S ALSO YOUR TESTIMONY, IS IT NOT, THAT THE AMOUNT BY WHICH THE INTRASEASONAL VALUES WILL BE HIGHER THAN THE SHORT-RUN VALUES IS NOT KNOWN?

A. I BELIEVE I STATED IT WAS AN EMPIRICAL QUESTION

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AS TO WHETHER THE VALUE WOULD BE X DOLLARS OR Y DOLLARS HIGHER.

Q. BUT IT WOULD BE HIGHER, WOULDN'T IT?

A. IT COULD BE, OR THEY COULD POSSIBLY BE THE SAME, BUT THEY WOULD PROBABLY BE HIGHER, AND I BELIEVE I TESTIFIED TO THAT UNDER CROSS WHEN WE HAD THE – WHEN I WAS FIRST ADMONISHED BY THE MASTER FOR NOT PAYING ATTENTION TO HIM. I DON'T RECALL EXACTLY WHAT THE VISUAL WAS, BUT WE HAD A VISUAL UP THERE, AND I THINK WE TALKED ABOUT THIS. AND I DID STATE THAT CONCEPTUALLY I WOULD AGREE THAT THE INTRASEASONAL WOULD BE HIGHER THAN THE SHORT RUN, WHICH WOULD BE HIGHER THAN THE LONG RUN.

SPECIAL MASTER: I DON'T ADMONISH WITNESSES. I JUST REQUESTED THAT YOU TURN AROUND.

THE WITNESS: I'M SORRY.

MR. DRAPER: AND THE EXHIBIT, FOR THE RECORD, THAT WE WERE TALKING ABOUT AT THAT TIME IS PLAINTIFF'S EXHIBIT 1070, THE ONE THAT COMPARED THE LONG RUN AND SHORT RUN AND SHORT-SHORT RUN.

Q. NOW, ONE OF THE SOURCES THAT YOU ARE RELYING UPON FOR THE COMPARISONS THAT YOU ARE TESTIFYING TODAY TO IS THE PAPER THAT YOU DID WITH MR. CHO; ISN'T THAT RIGHT?

A. THAT IS ONE OF THEM THAT'S IN HERE. AS I STATED EARLIER, I AM NOT TYING THIS COMPARISON TO ANY

SPECIFIC VALUE IN THE LITERATURE, RATHER, I WAS LOOKING AT THESE VALUES FROM VARIOUS STUDIES AS AN INDICATOR OF THE RANGE OF VALUES THAT ONE MIGHT EXPECT FOR THESE TYPES OF CROPS.

Q. AND THAT IS ONE OF THE SOURCES THAT, AGAIN, IS NOT AN INTRASEASONAL OR SHORT-SHORT-RUN STUDY; CORRECT?

A. IT'S A SHORT-RUN SITUATION REFLECTING AN AREA WHERE FARMERS ARE SOMEWHAT WATER-SHORT.

Q. DO YOU HAVE A COPY OF YOUR REPORT? IT'S PLAINTIFF'S EXHIBIT 1018 [Richard M. Adams & Seong Hoon Cho paper].

A. NO, I DO NOT.

Q. (COUNSEL HANDS DOCUMENT TO WITNESS.)

A. THANK YOU.

Q. YOU MADE AN ANALYSIS THAT'S REPORTED IN THIS JOURNAL ARTICLE OF WATER VALUES; ISN'T THAT RIGHT?

A. THE PURPOSE OF THE PAPER WAS NOT TO ESTIMATE WATER VALUE BUT, RATHER, IT WAS TO TALK ABOUT CHANGES IN FARM PROFITS UNDER DIFFERENT LAKE LEVELS FOR KLAMATH LAKE, OREGON, BUT ONE CAN DERIVE WATER VALUES FROM THE ASSESSMENT, BUT THAT WAS NOT NECESSARILY THE PRIMARY PURPOSE. IT WAS TO LOOK AT THE TRADE-OFF BETWEEN WATER FOR ENDANGERED SPECIES AND AGRICULTURE.

Q. BUT YOU DID DETERMINE THE WATER VALUES IN THE COURSE OF YOUR STUDY, DIDN'T YOU?

A. THAT IS CORRECT. THERE ARE SOME WATER VALUES

REPORTED IN THIS STUDY.

Q. YOU LOOKED AT FOUR DIFFERENT KINDS OF FARMING OPERATIONS, DIDN'T YOU?

A. I DID – OR WE DID, ACTUALLY.

Q. IF WE LOOK AT TABLE 7, WHICH IS ON PAGE 2746, YOU –

A. YES, SIR.

Q. – SET OUT IN TABLE 7 THE CROP MIX AND THE CROPPED ACRES, IRRIGATION TECHNIQUES, AND OTHER INFORMATION REGARDING EACH FARM MODEL; ISN'T THAT RIGHT?

A. YES, THAT'S TRUE.

Q. I THINK YOU'VE TESTIFIED EARLIER THAT EITHER MODELS II OR III WOULD BE THE ONES THAT WOULD BE CLOSEST TO THE CROP MIX THAT WE ARE DEALING WITH IN THIS CASE; ISN'T THAT RIGHT?

A. I THINK NO. 3 WOULD BE CLOSER.

Q. ALL RIGHT. LET'S TURN OVER, THEN, TO THE NEXT PAGE, WHICH IS TABLE 8.

A. NOW, I SHOULD POINT OUT THERE'S AN ERROR IN THIS TABLE.

Q. OH, WHERE IS THAT?

A. IT'S IN COLUMN 3, FARM MODEL III.

Q. AND WHERE DOES THE ERROR APPEAR?

A. WELL, THE ERROR APPEARS – IF YOU START CALCULATING INCREMENTAL CHANGES IN WATER AND THE CORRESPONDING CHANGES IN PROFITS, THERE'S AN ANOMALOUS RESULT THAT I SHOULD HAVE CAUGHT, AND

I'M EMBARRASSED TO SAY THAT I HAVE AN ERROR IN ONE OF MY PAPERS. BUT IF YOU LOOK AT THE CHANGE IN THE VALUE OF WATER ACROSS INCREMENTS, IT GOES FROM $11 FOR ONE VERY SMALL AMOUNT OF WATER, AND IT JUMPS TO 200, AND

THEN IT DROPS TO 160, AND THEN FOR THE MOST SEVERE REDUCTION, IT FALLS BACK TO 97.

AS AN ECONOMIST I WOULD KNOW – I SHOULD HAVE CHECKED THIS, BUT YOU NEVER EXPECT TO SEE AN UPWARD-SLOPING DEMAND CURVE FOR A DRY DEMAND, AND THAT'S BASICALLY WHAT THIS WOULD IMPLY, IS THAT SOMEHOW AT A CERTAIN RANGE, THERE'S AN UPWARD-SLOPING DEMAND CURVE.

AND IN GOING BACK AND LOOKING AT THE SOLUTION PROCEDURE, THE LINEAR PROGRAMMING MODEL, WHAT HAPPENED ON THAT PARTICULAR PIVOT POINT, THERE WAS SUCH A SMALL AMOUNT OF WATER TAKEN AWAY, THE MODEL BASICALLY HICCUPPED. SO THOSE ANALYSES OF THE MARGINAL VALUE OF WATER FOR THOSE LAST THREE OR FOUR – PARTICULARLY THE ONE THAT GOES UP – THE TWO THAT GO UP ARE ANOMALOUS RESULTS AND WOULD VIOLATE ECONOMIC ASSUMPTIONS.

SPECIAL MASTER: ARE YOU TALKING ABOUT TABLE 7, PROFESSOR?

THE WITNESS: TABLE 8, I BELIEVE, YOUR HONOR. HE WAS ASKING ABOUT TABLE 8. AND THE REFERENCE, YOUR HONOR, IS TO THIS COLUMN

JUST UNDER "FARM MODEL III." AND ONE WAY THAT A PERSON COULD TEASE OUT SOME MARGINAL VALUES FOR WATER WOULD BE TO CHANGE THE PROFITS ALONG WITH THE CHANGE IN WATER.

NOW, THE LEFT-HAND SIDE OF THAT TABLE REPORTS DIFFERENT LAKE LEVELS, AND IT ALSO SHOWS THE CORRESPONDING CHANGE IN WATER AVAILABILITY IN THE NEXT COLUMN. SO YOU CAN DO A CALCULATION BY SEEING HOW MUCH WATER WAS TAKEN AWAY FROM THE FARMS AND CALCULATING THE CHANGES IN PROFITS.

AND WHAT YOU SEE IS OVER IN THE FIRST FOUR OR FIVE CHANGES, IF YOU WERE TO CALCULATE THIS, THESE WATER VALUES AND MARGINAL VALUE OF WATER IS ABOUT $15 TO $20 A FOOT. THEN IT SUDDENLY JUMPS TO 200. THEN IT FALLS TO 160, AND THEN IT FALLS FURTHER TO 97.

ECONOMIC THEORY SAYS THAT THIS VALUE SHOULD BE GOING UP CONSTANTLY AS WE REDUCE THE RESOURCE OF INTEREST HERE, WHICH IN THIS CASE IS WATER. SO AGAIN, IT'S AN EMBARRASSMENT THAT THE ONE ARTICLE THAT MADE IT BEFORE THE SUPREME COURT IS IN ERROR.

BY MR. DRAPER:

Q. WELL, YOU'RE NOT ALONE, IF THAT'S ANY COMFORT. LET'S TAKE A LOOK AT THE NO. 2 MODEL, WHICH IS RELATIVELY CLOSE. IT'S HAY AND PASTURE WITH FLOOD IRRIGATION.

A. THAT'S REALLY NOT CLOSE.

Q. MY RECOLLECTION WAS THAT EITHER MODEL II OR MODEL III WERE THE ONES THAT YOU CONSIDERED CLOSE TO OUR SITUATION HERE.

A. I DON'T BELIEVE I STATED THAT. I THOUGHT I WAS STATING MODEL III. MODEL II DOES NOT HAVE ANY CROP COMPARABLE TO WHEAT OR GRAIN SORGHUM IN THIS MIX.

Q. OKAY.

A. AGAIN, I THINK NO. 3 IS THE ONE THAT WOULD BE COMPARABLE. IT HAS BARLEY, WHICH IS A LITTLE MORE PROFITABLE, PERHAPS, THAN GRAIN SORGHUM. IT HAS WHEAT. IT HAS ALFALFA. AND IT ALSO HAS [*sic*] TO LOWER VALUE CROPS. I DON'T BELIEVE – AT LEAST IN MY OPINION, I DON'T CONSIDER II TO BE COMPARABLE.

Q. OKAY. LET'S TURN OVER, THEN, TO TABLE 10, WHICH IS ON THE SECOND TO LAST PAGE. IT'S PAGE NO. 2748. DO YOU SEE TABLE 10?

A. YES, SIR, I DO.

Q. THERE YOU LIST "MARGINAL WATER VALUE FOR MODELED FARMS UNDER DIFFERENT WATER SUPPLIES"; RIGHT?

A. CORRECT.

Q. SO WE CAN COMPARE THE VALUE OF WATER THAT YOU FOUND ASSOCIATED WITH EACH OF THE DIFFERENT FARMING MODELS, CAN'T WE?

A. WE CAN. BUT, AGAIN, FARM MODEL III, THAT CALCULATION IS NOT CORRECT.

SPECIAL MASTER: IS IT GOING TO BE

HIGHER OR LOWER?

THE WITNESS: IT WOULD BE LOWER.

SPECIAL MASTER: CAN YOU ESTIMATE BY WHAT PERCENTAGE? IS IT GOING TO BE A DOLLAR OR TWO OFF?

THE WITNESS: ACTUALLY, I DID THE CALCULATION. I BELIEVE IT COMES OUT TO BE – IF WE LOOK AT THE BASE CASE, 2.69, AND WE LOOK AT EVEN THE MOST EXTREME CASE, WHICH IS 1.69, IF WE TAKE AN ACRE FOOT AWAY FROM THAT FARM, I BELIEVE THE VALUE COMES OUT TO BE EITHER $56 OR $65 RATHER THAN 80. I DON'T HAVE MY CALCULATOR HERE, YOUR HONOR, BUT I DID CHECK THAT WHEN I DISCOVERED THIS OTHER ERROR.

SPECIAL MASTER: SO 80 IS GOING TO BE APPROXIMATELY WHAT THAT IS?

THE WITNESS: IT'S EITHER 56 OR 65, I BELIEVE, IN THAT RANGE.

BY MR. DRAPER:

Q. SO IT'S STILL HIGHER THAN THE MODEL II?

A. IT IS. BUT I – AND HAVING DISCOVERED THIS ERROR IN FARM MODEL III, I'M UNCOMFORTABLE WITH THIS TABLE. AGAIN, THAT'S WHY I TRIED NOT TO PIN ANY OF THESE – TO PIN MY ASSESSMENT OF THE REASONABLENESS OF THE KANSAS ESTIMATES ON ANY PARTICULAR EMPIRICAL STUDY.

EMPIRICAL STUDIES DO, UNFORTUNATELY, HAVE ERRORS THAT DON'T GET CAUGHT IN THE REVIEW

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PROCESS. THAT'S WHY I THINK IT'S IMPORTANT THAT WE LOOK AT A RANGE OF STUDIES AND A RANGE OF VALUES TO UNDERSTAND WHAT THE LIKELY VALUE OF WATER WOULD BE.

Q. ARE YOU WITHDRAWING YOUR ENDORSEMENT OF THIS [EXHIBIT] FOR PURPOSE[S] OF THIS CASE?

A. I THINK, GIVEN MY UNCERTAINTY ABOUT THESE NUMBERS AND GIVEN THAT I HAVE OTHER ESTIMATES IN THIS TABLE, I WOULD CHOOSE TO WITHDRAW THIS.

Q. ALL RIGHT. WELL, THAT WILL SAVE US A GOOD BIT OF TIME. IN FACT, I THINK WITH THAT, I AM FINISHED. NO MORE QUESTIONS.

REDIRECT EXAMINATION

BY MR. ROBBINS:

Q. WITHOUT RELIANCE ON THE ADAMS AND CHO PAPER, DO YOU FEEL THAT YOUR OPINION IS WEAKENED OR CHANGED IN ANY WAY?

A. ABSOLUTELY NOT.

Q. THANK YOU.

I HAVE NO OTHER QUESTIONS, YOUR HONOR.

* * *

Appendix Item 4

Excerpt from
RT Vol. 203
January 12, 2000
Direct Examination of Norman K. Whittlesey

Direct Examination of Norman K. Whittlesey
[RT Vol. 200 at 103-108]

* * *

Q. NOW, THE EVALUATION BY RICHARD M. ADAMS, IS THAT DEFENDANT'S EXHIBIT 1203?

A. YES.

Q. AND IN PLAINTIFF'S EXHIBIT 1017, DID YOU MAKE AN ANALYSIS OF PROFESSOR ADAMS' WORK?

A. YES, I DID.

Q. HOW DID YOU GO ABOUT DOING THAT?

A. WELL, PROFESSOR ADAMS' APPROACH TO HIS REPORT WAS TO COLLECT VALUES OF WATER FROM PUBLISHED LITERATURE OVER SOME HISTORIC PERIODS AND FROM VARIOUS REGIONS OF THE WESTERN UNITED STATES.

Q. HE DID A LITERATURE REVIEW?

A. IN ESSENCE, THAT WAS HIS REPORT. IT WAS A LITERATURE REVIEW INTENDED TO COMPARE WATER VALUES FROM THE PUBLISHED LITERATURE WITH THOSE WHICH HE DEVELOPED FROM THE MEASURE OF KANSAS DAMAGES FOR CROP LOSS FROM THE KANSAS REPORT.

Q. NOW, IN THE CROSS-EXAMINATION OF PROFESSOR ADAMS, HE AND I DEVELOPED WHAT IS MARKED AS PLAINTIFF'S EXHIBIT 1070. DO YOU HAVE THAT?

A. YES, I DO.

Q. WHAT IS THE RELEVANCE OF PLAINTIFF'S

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EXHIBIT 1070 TO THE ANALYSIS IN PROFESSOR ADAMS' REPORT?

A. IN A VERY ABSTRACT SENSE, WHAT IS SHOWN IN EXHIBIT 1070 IS AT LEAST THREE POSSIBLE MEASURES OF WATER VALUE THAT CAN BE DERIVED BASED ON, IN THIS CASE, THE DEFINITION OF TIME HORIZON, LONG RUN AND SHORT RUN AND WHAT'S CALLED A SHORT-SHORT RUN IN THIS CASE AND WHAT I REFERRED TO IN MY REPORT AS AN INTRASEASONAL SITUATION.

IN GENERAL, THE DEFINITION OF "LONG RUN" IN ECONOMICS IS THAT ALL COSTS ARE VARIABLE. SO WE'RE STARTING FROM A POSITION IN WHICH THERE ARE NO INVESTMENTS AND MAKING OR COLLECTING INFORMATION OR MAKING AN ANALYSIS ABOUT A DECISION, IN THIS CASE, PERHAPS REGARDING WHETHER TO IRRIGATE OR DEVELOP IRRIGATION.

AND SO IN SUCH A SITUATION, IF ONE IS CONSIDERING THE POSSIBILITY OF DEVELOPING A NEW IRRIGATION PROJECT IN THE DESERT, LET'S SAY, WHERE THERE'S NO CROPLAND AND NOTHING THERE THAT WE CAN, SAY, DRILL WELLS AND START IRRIGATING, WE HAVE TO CONSIDER AS THE RETURNS TO THE WATER, OR THE NET VALUE OF THE WATER, NOT ONLY ALL OF THE COSTS OF PRODUCTION – THE USUAL VARIABLE COSTS OF FERTILIZER AND MACHINERY AND SEED AND SO ON – BUT

ALL THE FIXED COSTS OF THE DEPRECIATION AND CAPITAL ASSOCIATED WITH MACHINERY AND IN ADDITION TO THE COST OF

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OBTAINING THE WATER.

NOW, THERE'S A COUPLE OF WAYS ONE CAN DO THAT. BUT NEVERTHELESS, WHAT WE'RE TALKING ABOUT IN THE LONG RUN IS A VALUE OF WATER THAT IS NET OF TOTAL COSTS, FIXED AND VARIABLE COSTS. AND BECAUSE WE ARE ACCOUNTING FOR WHAT SHOULD BE ALL COSTS IN THAT SETTING, WE WOULD EXPECT THE VALUE OF WATER TO BE LOWEST OF THOSE POSSIBILITIES THAT EXIST.

THE NEXT AND WHAT I CALL SHORT RUN AND WHAT IS LABELED AS SHORT RUN IN THIS CASE IS NORMALLY THAT WHICH IS OBSERVED IN THE LITERATURE AS DEVELOPED BY AN ECONOMIST WITH BUDGET STUDIES OR LINEAR PROGRAMMING OR NONLINEAR PROGRAMMING IN WHICH THE VARIABLE COSTS OF PRODUCTION OF CROPS ARE PART OF THE ANALYSIS AND HENCE BECOME SUBTRACTED FROM THE GROSS VALUE OF WATER FOR CROP PRODUCTION. AND IN THAT SENSE, WE GET WHAT IS LABELED AS A MIDDLE VALUE OF WATER OR SOMETHING THAT WOULD BE BETWEEN THE LOWEST AND THE HIGHEST.

THE SHORT-SHORT RUN, OR WHAT MIGHT BE VIEWED AND WHAT I TERM THE INTRASEASONAL SETTING, IS THAT OF – LET ME BACK UP AND SAY ONE MORE THING ABOUT THE SHORT RUN JUST SO

IT'S CLEAR. AND THAT IS THAT IN GENERAL WHAT THAT IMPLIES IS THAT THE QUANTITY OF THE WATER AVAILABLE TO THE FARM IS KNOWN AT THE BEGINNING

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OF THE SEASON SO THAT ALL DECISIONS ABOUT INPUT COSTS ARE ABSOLUTELY KNOWN AND THAT ONE CAN THEN OPTIMIZE, IN ECONOMIST'S TERMS, THE USE OF THAT WATER IN DERIVING THE HIGHEST POSSIBLE VALUE IN CROP PRODUCTION.

AND THE SHORT-SHORT RUN, OR THE INTRA-SEASONAL CASE, WE ARE TALKING ABOUT THE CONDITIONS THAT EXISTED IN WESTERN KANSAS IN THE DITCH SERVICE AREA WHERE CROPS WERE ESTABLISHED, CROPS WHICH WERE DROUGHT TOLERANT IN LARGE PART – WHEAT, SORGHUM, AND ALFALFA – BUT WOULD ALWAYS RESPOND TO WATER. AND WE'RE DESCRIBING THE INCREMENT OF YIELD THAT WOULD HAVE BEEN ACHIEVED IF THE WATER WERE APPLIED TO THESE GROWING CROPS.

SO WE ARE NOT CONCERNED ABOUT THE EFFECTS OF THE VARIABLE OR THE FIXED COSTS BECAUSE THE CROP IS ALREADY THERE. THE ONLY MARGINAL COSTS THAT BECOME RELEVANT AT THIS POINT ARE THOSE ASSOCIATED WITH THE APPLICATION OF THE ADDITIONAL WATER, OR THE IRRIGATION COST, AND THE ACCOUNTING FOR THE HARVEST OF THE ADDITIONAL CROP. SO IN THIS CASE, WE ARE GOING TO SUBTRACT FROM GROSS

REVENUE ONLY THE MARGINAL COSTS ASSOCIATED WITH THAT INCREMENT OF WATER AND PRODUCTION. AND IN THIS CASE, WE WOULD GET THE HIGHEST VALUE OF WATER IN THE RANGE OF THE THREE THAT WE DESCRIBED HERE.

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Q. IN MAKING COMPARISONS WITH REGARD TO WATER VALUES, IS IT IMPORTANT TO KNOW WHICH TIME HORIZON YOU'RE DEALING WITH IN EACH CASE?

A. YES, IT IS. AND IT WOULDN'T, FOR EXAMPLE, BE APPROPRIATE TO USE A LITERATURE VALUE FOR A SHORT-RUN OR A LONG-RUN CONDITION OR SET OF ASSUMPTIONS AND THEN SAY THAT THAT COMPARES TO THE INTRASEASONAL VALUE THAT WE ARE ASSESSING IN THIS CASE.

THE INTRASEASONAL VALUE IS NOT UNLIKE – I BELIEVE I HEARD THE LANGUAGE IN THE COURT HERE AT SOME POINT IN REVIEW OF SOME ARTICLE ABOUT WATER VALUE IN CALIFORNIA THAT WAS NEEDED TO FINISH THE CROP, AND IT HAD A VERY HIGH VALUE. I DON'T REMEMBER WHICH IRRIGATION WE WERE TALKING ABOUT OR WHO WAS TALKING ABOUT IT. BUT THAT'S THE NATURE OF WHAT WE'RE TALKING ABOUT HERE IS GETTING MORE OUT OF THE EXISTING CROP.

Q. DID YOU ANALYZE PROFESSOR ADAMS' REPORT, DEFENDANT'S EXHIBIT 1203, TO DETERMINE WHETHER ANY OF THE VALUES THAT HE REPORTED THERE WERE COMPARABLE TO THE

INTRASEASONAL VALUES THAT WE ARE DEALING WITH IN THIS CASE?

A. YES, I DID.

Q. LET ME ASK YOU TO TURN TO TABLE 1 IN DEFENDANT'S EXHIBIT 1203. THAT'S JUST AFTER PAGE 9.

SPECIAL MASTER: TABLE 3?

MR. DRAPER: TABLE 1.

Q. DOES THIS TABLE SHOW SOME OF THE SOURCES THAT PROFESSOR ADAMS COLLECTED?

A. YES, IT DOES.

Q. DID YOU DETERMINE WHETHER ANY OF THE SOURCES CITED FOR THE WATER VALUES ASSOCIATED WITH WHEAT, GRAIN SORGHUM, OR ALFALFA – DID YOU DETERMINE WHETHER ANY OF THOSE WERE COMPARABLE TO THE INTRASEASONAL TIME HORIZON THAT WE'RE DEALING WITH IN THIS CASE?

A. YES. I DID REVIEW ALL OF THE LITERATURE THAT IS REPRESENTED BY THE CROPS AND THEIR RESPECTIVE VALUES IN THAT TABLE. AND IN ALL CASES BUT ONE, THE VALUES WERE REPRESENTATIVE OF WHAT I WOULD DESCRIBE AS SHORT RUN WITH ONLY ONE – AND THEN A – ACTUALLY, LET'S SEE. LET ME BE SURE I DON'T MISSPEAK. YEAH, THAT'S TRUE. AND THEN THE ONE VALUE – THERE'S ONE SET OF VALUES OR ONE REFERENCE FROM WASHINGTON STATE UNIVERSITY THAT

RELATED TO AN IRRIGATION DEVELOPMENT PROJECT IN SOME NONIRRIGATED PARTS OF THE STATE THAT WOULD HAVE TO BE DESCRIBED AS A LONG-RUN VALUE.

SO IN SUMMARY, ALL OF THE VALUES IN THE TOP HALF OF THIS TABLE RELATING TO WHEAT AND SORGHUM AND ALFALFA ARE OF A NATURE WHICH WOULD NOT BE DIRECTLY COMPARABLE TO THOSE BEING DETERMINED OR THE TYPE OF ANALYSIS BEING CARRIED OUT IN THE KANSAS CASE.

Appendix Item 5

Excerpt from RT Vol. 211
January 25, 2000
Cross Examination of James S. Lochhead

Cross Examination of James S. Lochhead
[RT Vol. 211 at 95-96]

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* * *

Q. I'D LIKE TO SHOW YOU WHAT WE'VE MARKED AS PLAINTIFF'S EXHIBIT 1089. THIS IS A MEMORANDUM WRITTEN BY YOU, IS IT NOT?

A. YES, IT IS.

Q. THIS WAS WRITTEN IN CONNECTION WITH YOUR ANALYSIS FOR PURPOSES OF THIS CASE?

A. THAT'S CORRECT.

Q. WOULD YOU READ THE SECOND PARAGRAPH OF THE MEMORANDUM, PLEASE.

A. THE SECOND NUMBERED PARAGRAPH OR SECOND OVERALL?

Q. THE SECOND PARAGRAPH ON PAGE 1.

A. "THE PVID PROGRAM IS GENERALLY REPORTED AS BEING SUCCESSFUL FROM AN ADMINISTRATIVE, FINANCIAL, AND ECONOMIC STANDPOINT. MWD PAID A TOTAL OF $26.6 MILLION FOR 185,978 ACRE-FEET OF WATER OVER A TWO YEAR PERIOD, OR $143 PER ACRE-FOOT OF WATER PER YEAR. ASSUMING SIMILAR PROGRAM COSTS, THE COST OF WATER IN THE ARKANSAS BASIN MAY BE

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HIGHER, SINCE GROWING SEASON AND ANNUAL CONSUMPTIVE USE PER ACRE ARE LESS."

Q. DID YOU DO ANY FURTHER INVESTIGATION OF THE PRICE ASPECT OF THE WATER BANK?

A. NO. AND, IN FACT, I REALLY DIDN'T DO ANY INVESTIGATION OF THE PRICE ASPECT OF THE WATER BANK.

* * *

Supreme Court, U.S.
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No. 105, Original (31)

In The

Supreme Court of the United States

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

UNITED STATES OF AMERICA,

Defendant-Intervenor.

On Exceptions To The Third Report Of The Special Master

COLORADO'S REPLY TO BRIEF FOR THE UNITED STATES IN OPPOSITION TO THE EXCEPTIONS OF KANSAS AND COLORADO

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COLORADO'S REPLY TO BRIEF FOR THE UNITED STATES IN OPPOSITION TO THE EXCEPTIONS OF KANSAS AND COLORADO

I. INTRODUCTION

The United States was allowed to intervene in this original action as a defendant to protect federal interests related to the operation of federal reservoirs in the Arkansas River Basin in Colorado. The claims regarding the Winter Water Storage Program in Pueblo Reservoir and the operation of Trinidad Reservoir were resolved in the liability phase, and the United States did not participate in the remedies phase of this case, which related to Kansas' claim that post-Compact well pumping in Colorado had violated Article IV-D of the Compact. Nevertheless, the United States has chosen to address two questions raised by Colorado's and Kansas' exceptions to the Third Report of the Special Master: (1) whether a money damages remedy based, in part, on the losses incurred by individual Kansas water users due to post-Compact well pumping in Colorado violates the Eleventh Amendment, and (2) whether the Special Master erred in recommending that a money damages remedy include prejudgment interest, but that prejudgment interest should only be awarded from 1969 to the date of judgment.[1]

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[1] The United States has no direct interest in these issues. The Eleventh Amendment is not a bar to a suit by the United States against a state, *Alden v. Maine*, 527 U.S. 706, ___, 144 L. Ed. 2d 636, 679 (1999), and the general rule is that prejudgment interest is due on debts owed to the federal government, including debts owed by states and local governments. *United States v. Texas*, 507 U.S. 529, 533-34 (1993).

II. *NORTH DAKOTA V. MINNESOTA* CANNOT FAIRLY BE DISTINGUISHED ON THE BASIS SUGGESTED BY THE UNITED STATES

The United States recommends that Colorado's exception to the Master's Third Report based on the Eleventh Amendment be overruled. Brief for the United States 21. The United States contends that under this Court's cases, the Eleventh Amendment bars a suit by a state "only if it is appearing as a nominal party for the purpose of advancing the private claims of individual citizens of the State against another State." *Id.* at 11. The United States asserts that in this case Kansas has sued to protect its sovereign interest as a party to an interstate compact and its quasi-sovereign interests in the health and economic well-being of its citizens, and contends: "Nothing in the Eleventh Amendment bars the Court from calculating the amount of those damages by reference to the injuries sustained by the individual water users who comprise [a part of] the general population that Kansas has a legitimate quasi-sovereign interest in protecting." *Id.*

The United States asserts that *New Hampshire v. Louisiana*, 108 U.S. 76 (1883), and *North Dakota v. Minnesota*, 263 U.S. 365 (1923), illustrate circumstances in which a suit by a state is barred under the Eleventh Amendment because the state was appearing "only as a nominal party in presenting personal claims of its citizens, and not as *parens patriae* seeking to protect the general interests of the State and its inhabitants." Brief for the United States 16. The United States states that in *New Hampshire v. Louisiana* the Court concluded that the suit was barred by the Eleventh Amendment because it was a mere subterfuge for recovery on behalf of individual bondholders because the states were acting as mere collection agents of the owners of the bonds and coupons, the suits were under the actual control of individual citizens, and were prosecuted by and for them. *Id.* at 15-16.

The United States says that in *North Dakota v. Minnesota* the Court ruled that the Eleventh Amendment barred North Dakota from bringing a damages claim against Minnesota for losses to individuals because the Court found that nearly all of the North Dakota farm owners whose crops, lands, and property were injured in floods had contributed to a fund which had been used to aid in the preparation and prosecution of the lawsuit and that it appeared that each contributor expected to share in the benefit of the decree for damages "in proportion to the amount of his loss." *Id.* at 16, quoting *North Dakota v. Minnesota*, 263 U.S. at 375. Thus, according to the United States, "North Dakota was acting, not as *parens patriae*, but as a trustee, seeking to present and enforce private claims of its citizens." *Id.* at 17.

New Hampshire v. Louisiana can be distinguished on the basis suggested by the United States, but not *North Dakota v. Minnesota*. In *North Dakota v. Minnesota*, the State of North Dakota was acting in its quasi-sovereign capacity to protect the general comfort, health, and property rights of its inhabitants injured by flooding. *North Dakota v. Minnesota*, 263 U.S. at 374, 375-76.[2] Since that was a proper action by North Dakota to protect its quasi-sovereign interest in the general health and welfare of its residents, if the reasoning of the United States is correct, the calculation of damages based on the losses suffered by the farm owners in North Dakota should have been permitted. *See* Brief for the United States 19.

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[2] The United States asserts that the Master concluded, and Colorado does not dispute, that Kansas is seeking recovery for injuries to its legitimate quasi-sovereign interest in the general economic well-being and property of its citizens, interests which are "independent and behind the titles of its citizens." Brief for the United States 18. However, that was also true in *North Dakota v. Minnesota*. Colorado disputes that losses to individuals are the proper measure of injury to Kansas' quasi-sovereign interests.

If the United States is correct that the Eleventh Amendment does not bar the Court from calculating the amount of damages awarded to a state for vindication of its quasi-sovereign interests based on the losses sustained by individuals, then the fact that North Dakota intended to pay over the damages it recovered to the farm owners who had been injured by the flooding should have been irrelevant, since this Court has said that a state is free to spend the money recovered as damages for vindication of the general public interest in any way it determines is in the public interest. *Texas v. New Mexico*, 482 U.S. 124, 132 n.7 (1987). Likewise, the fact that North Dakota farm owners injured by the flooding contributed to a fund that had been used to aid in the preparation and prosecution of the cause should have been irrelevant. Focusing on the source of funding to prepare or prosecute the lawsuit is to elevate form over substance.

In this case, Kansas has enacted a statute that any funds recovered as damages will be paid into an interstate water litigation fund, a portion of which will be used for projects to assist water users in areas directly impacted by the provisions of the Compact. Kan. Stat. Ann. §§ 82a-1801 to 1803 (set out in the Appendix). However, the first use of the funds is to reimburse the Kansas Attorney General for expenses incurred in this litigation and in preparation for the litigation. Kan. Stat. Ann. §§ 82a-1801(a)(1) and (b). Kansas argues, based on *Texas v. New Mexico*, that prejudgment interest on the damages awarded based on the losses suffered by the individual water users in Kansas should be based on the interest rates experienced by the water users precisely because Kansas could distribute the damages to them. Reply Brief for Kansas Opposing the Exceptions of Colorado 35-36. If Kansas is correct in its reading of *Texas v. New Mexico*, it could direct that the money damages recovered in this case be paid directly to Kansas water users "in proportion to the amount of [their] loss." Thus, having first deducted the expenses incurred to prepare and prosecute this litigation from the damages that might be distributed to

Kansas water users, it could be said that the water users in Kansas are paying the expenses to prepare and prosecute this lawsuit.

The fact that the North Dakota farm owners had contributed to a fund to prepare and prosecute the lawsuit or that it appeared that North Dakota intended to pay over the damages to the farm owners whose crops, lands, and property were injured in proportion to the amount of their losses is not a principled basis to distinguish *North Dakota v. Minnesota* from this case, and will simply ensure that in the future states suing for damages to their sovereign or quasi-sovereign interests do not accept contributions from the individuals injured to prepare or prosecute the lawsuit or say that they intend to pay over what is recovered to those injured, at least until the lawsuit is over.[3]

In fact, Colorado believes that *North Dakota v. Minnesota* rests on a different ground, namely, that there is a distinction between losses to a state's proprietary and quasi-sovereign interests and losses suffered by private parties. *See Alfred L. Snapp & Son, Inc. v. Puerto Rico*, 458 U.S. 592, 602 (1982) ("Interests of private parties are obviously not in themselves sovereign interests, and they do not become such simply by virtue of the State's aiding in their achievement.").[4] In a proper original action, a state may sue another state for injuries to its quasi-sovereign interests in the comfort, health, and prosperity of its inhabitants, but that right is to be distinguished from its

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[3] The effect would be that states could prosecute *parens patriae* claims and recover damages based on the losses incurred by individuals so long as the arrangement was in effect a contingency fee rather than payment of costs and expenses by the individuals injured.

[4] The $5,000 in damages claimed by North Dakota were to its proprietary interests in roads and bridges damaged by flooding. 263 U.S. at 371-72. *See Alfred L. Snapp & Sons, Inc. v. Puerto Rico*, 458 U.S. 592, 601-07 (1982) (describing proprietary and quasi-sovereign interests of the states).

lost power as a sovereign to present and enforce individual claims of its citizens as their trustee. *North Dakota v. Minnesota*, 263 U.S. at 374-76. To say that a state may not present and enforce individual claims of its citizens as their trustee, but may recover damages to its sovereign and quasi-sovereign interests calculated "by reference to the injuries sustained by the individual water users" is mere word play that ignores the underlying purpose of the Eleventh Amendment, which was to protect the states from unconsented suits by citizens. *Seminole Tribe of Florida v. Florida*, 517 U.S. 44, 54 (1996). This is particularly true if the state is free to decide that it is in the public interest to distribute the damages to the individual water users who were injured.

III. THE "AGGREGATION" THEORY ADVANCED BY THE UNITED STATES FAILS TO CONSIDER *PARENS PATRIAE* CASES WHERE THE ELEVENTH AMENDMENT IS NOT A BAR

The United States argues that the Master's recommendation that damages include the losses suffered by individual Kansas water users does not violate the Eleventh Amendment because the Master merely calculated the injuries to Kansas' proper quasi-sovereign interest in its residents' health and welfare as "the sum of the damages for injuries to Kansas's residents, including the direct injuries suffered by water users." Brief for the United States 20. According to the United States, once this Court determined that Kansas had "appropriately commenced the current action to protect its sovereign and quasi-sovereign interests" under the Compact, the Eleventh Amendment was no longer an issue, and Kansas' damages could be measured in any fair and equitable manner. *Id.* at 18, 21. This "aggregation" theory, however, is inconsistent with this Court's explanation of the concept of *parens patriae* standing and will create real problems in the expanding field of *parens patriae* litigation.

This Court originally recognized the states' ability to bring *parens patriae* actions against sister states to enjoin public nuisances. *See Alfred L. Snapp & Son, Inc. v. Puerto Rico*, 458 U.S. at 602-05, and cases cited therein. Later cases recognized the states' interests as *parens patriae* in general economic well being, *id.* at 605-07, and in participation in the federal system. *Id.* at 607-08. As *Snapp* exemplifies, states are filing *parens patriae* actions against private entities with increasing frequency. States have sought to protect their general economies from anti-competitive actions, *see Hawaii v. Standard Oil Co.*, 405 U.S. 251 (1972), and from fraudulent conspiracies. *See People v. Life of Mid-America Ins. Co.*, 805 F.2d 763 (7th Cir. 1986); *People ex rel. Abrams v. Seneci*, 817 F.2d 1015 (2d Cir. 1987). States have also sought recoveries for natural resources damages. *See Satsky v. Paramount Communications, Inc.*, 7 F.3d 1464 (10th Cir. 1993); *Alaska Sport Fishing Ass'n v. Exxon Corp.*, 34 F.3d 769 (9th Cir. 1994).

Parens patriae actions by states against private parties raise some difficult issues in determining damages. Although this Court's decision to dismiss Hawaii's *parens patriae* claim for triple damages under § 4 of the Clayton Act in *Hawaii v. Standard Oil Co.* ultimately turned on Congress' intent in enacting the Clayton Act, the Court expressed concern about possible double recoveries if a state were able to recover for general economic injuries while its residents were allowed to recover for all their economic injuries. *Hawaii v. Standard Oil Co.*, 405 U.S. at 263-64. In dissent, Justice Brennan noted that *parens patriae* recovery

> does not necessarily lead to double recovery. Since Hawaii is by definition asserting claims 'independent of and behind the titles of its citizens,' there may be excluded from its recovery any monetary damages that might be claimed by its citizens individually or as part of a properly constituted class.

Id. at 276-77 (citation omitted). The United States' theory here that *parens patriae* damages may be measured by

reference to individual damages, of course, will virtually guarantee double recovery in any situation where individual claims for damages are not foreclosed by the Eleventh Amendment.

There is another potential result of the United States' "aggregation" theory, the opposite of double recovery but equally undesirable. Under a number of environmental statutes, states have obtained recoveries for natural resources damages. Courts have held that state recoveries for damages to quasi-sovereign interests do not preclude private actions for damages to private interests. *Satsky v. Paramount Communications, Inc.*, 7 F.3d 1464 (10th Cir. 1993). Where a state has recovered for natural resources damages to a general public interest, such as recreational fishing, however, private citizens are precluded from seeking recovery for their loss of enjoyment of that interest. *Alaska Sport Fishing Ass'n v. Exxon Corp.*, 34 F.3d 769 (9th Cir. 1994). If a state is entitled to recover damages to its quasi-sovereign interests that are the sum of private citizens' damages, it follows that under *res judicata* those private citizens are bound by the previous judgment and cannot seek to recover their own damages.

Neither of these results – double recoveries or allowing a state to recover damages rather than the individuals who suffered them – is desirable.[5] This Court has always emphasized that a state's interest as *parens patriae* is separate and independent from the interests of particular private parties, *e.g.*, *Snapp*, 458 U.S. at 607, and that is why the Master's quantification of damages based on the

---

[5] The Master concluded that the potential for double recovery should not be a problem in this case because, if the losses suffered by Kansas water users are included in any damages awarded, such a judgment should "seal off" any later recovery attempts by the water users. App. to Third Report 33. But, it is not desirable to allow a state to recover damages based on losses suffered by private individuals and preclude the private individuals from recovering those losses.

losses incurred by individual water users in Kansas should not be accepted.

Colorado acknowledges that this Court has broad power in a case between states to fashion a fair and equitable remedy for breach of an interstate compact. *See Georgia v. Pennsylvania R. Co.*, 324 U.S. 439, 450 (1945). The Court should not, however, fashion such a remedy without consideration of both the nature of *parens patriae* recoveries and the particular equitable considerations in this case. For reasons previously stated, Colorado does not believe that an award of money damages based on all losses suffered as a result of post-Compact well pumping in violation of the Arkansas River Compact is a fair and equitable remedy for a violation of this Compact prior to the time that Colorado knew, or should have known, that post-Compact well pumping was depleting the usable Stateline flows of the Arkansas River in violation of Article IV-D of the Compact. Further, Colorado believes that in fashioning a fair and equitable remedy in this case, the Court should take into consideration the difficulty of proving depletions to Stateline flows caused by well pumping. *See* Colorado's Brief in Support of Exceptions 30-37; *see also Kansas v. Colorado*, 206 U.S. 46, 107 (1907) ("The underground movement of water will always be a problem of uncertainty.")

IV. THE UNITED STATES DOES NOT ACCURATELY STATE COLORADO'S POSITION ON PREJUDGMENT INTEREST AND DOES NOT ADDRESS COLORADO'S ARGUMENT THAT AN AWARD OF PREJUDGMENT INTEREST BEGINNING IN 1969 IS INCONSISTENT WITH THE COURT'S 1995 OPINION

The United States asserts that Colorado objects to the Special Master's recommendation that prejudgment interest be awarded for the period from 1969 to the present, "urging the Court to adopt a categorical rule barring an

award of prejudgment interest for violation of an interstate compact apportioning the flows of an interstate river." Brief for the United States 11. The United States misstates Colorado's position.

Colorado urged the Court to follow the traditional common law rule that prejudgment interest is not awarded on unliquidated damages, absent bad faith or other exceptional circumstances. Colorado Brief in Support of Exceptions 28; *see Kansas v. Colorado*, 206 U.S. 46, 96-98 (1907) (power granted by the Constitution vests this Court with power to settle disputes between states); *Texas v. New Mexico*, 482 U.S. 124, 129 (1987) (looking to general principles of contract law to determine whether Court should provide a remedy). In the alternative, if the Court concludes that an award of prejudgment interest is discretionary, Colorado has taken issue with the Master's finding that, by 1968, Colorado knew, or should have known, that post-Compact well pumping in Colorado was causing such depletions. Colorado's Reply Brief 19-21. The United States says that "the Master reasonably balanced the relevant factors in awarding prejudgment interest beginning in 1969, when, the Master found, Colorado first knew or should have known that groundwater pumping in [Colorado] was depleting stateline flows of the Arkansas River." Brief for the United States 12-13.[6] However, the United States does not address Colorado's argument that the Master's finding is inconsistent with this Court's 1995 opinion, holding that the evidence available to Kansas was too vague and conflicting to demonstrate that Kansas inexcusably delayed in bringing its claim. Colorado's Reply Brief 20. Nor does the United States address Colorado's argument that if damages are

[6] The United States does not fully state the Master's finding. He found that by 1969, Colorado knew, or should have known, that post-Compact well pumping was causing material depletions of *usable* Stateline flows. Third Report at 103.

awarded to the State of Kansas based on the losses suffered by individual water users in Kansas, an award of prejudgment interest should not be made because it would overcompensate Kansas for losses to the State of Kansas and the general economy of Kansas. *Id.* at 34-35.

CONCLUSION

The United States did not participate in the remedies phase of this case and does not have a direct stake in the issues it has chosen to address. Its brief does not present a principled basis for distinguishing the key Eleventh Amendment case of *North Dakota v. Minnesota*. It argues a *parens patriae* damages theory that will have far-reaching consequences, and misstates or ignores Colorado's argument regarding prejudgment interest. For the reasons stated, Colorado's exceptions to the Master's Third Report should be granted.

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APPENDIX

Kansas Statutes Annotated
§§ 82a-1801 to 82a-1803

82a-1801

CHAPTER 82A. – WATERS AND WATERCOURSES
ARTICLE 18. – WATER LITIGATION

82a-1801. **Moneys recovered in certain litigation; disposition**. (a) Amounts recovered by the state of Kansas from a settlement, judgment or decree in the litigation brought in 1985 by the state of Kansas against the state of Colorado to resolve disputes arising under the Arkansas river compact shall be deposited in the state treasury and credited as follows:

(1) Until the aggregate amount of moneys credited to the interstate water litigation fund equals the aggregate of all amounts certified by the attorney general under subsection (b), 100% shall be credited to the interstate water litigation fund.

(2) When the aggregate amount of moneys credited to the interstate water litigation fund equals the aggregate of all amounts certified by the attorney general under subsection (b), 33 1/3% shall be credited to the state water plan fund for use for water conservation projects and 66 2/3% shall be credited to the water conservation projects fund.

(b) The attorney general shall certify to the director of accounts and reports any expenses incurred by the state in the litigation brought in 1985 by the state of Kansas against the state of Colorado to resolve disputes arising under the Arkansas river compact and in preparation for such litigation.

82a-1802

CHAPTER 82A. – WATERS AND WATERCOURSES
ARTICLE 18. – WATER LITIGATION

82a-1802. Same; interstate water litigation fund. (a) There is hereby established in the state treasury the interstate water litigation fund, to be administered by the attorney general.

(b) Revenue from the following sources shall be credited to the interstate water litigation fund:

(1) Amounts provided for by K.S.A. 82a-1801; and

(2) moneys received from any source by the state in the form of gifts, grants, reimbursements or appropriations for use for the purposes of the fund.

(c) From the moneys first credited to the interstate water litigation fund, persons or entities that contributed moneys to the court cost fund account of the office of the attorney general for use in the litigation described in subsection (b)(1) shall be reimbursed the amount contributed. The balance of moneys credited to the fund shall be expended only for the purpose of paying expenses incurred by the state in:

(1) Current or future litigation or preparation for future litigation with another state, the federal government or an Indian nation to resolve a dispute concerning water; or

(2) monitoring or enforcing compliance with the terms of an interstate water compact or a settlement, judgment or decree in past or future litigation to resolve a dispute with another state, the federal government or an Indian nation concerning water.

(d) Interest attributable to moneys in the interstate water litigation fund shall be credited to the state general fund as provided by K.S.A. 75-4210a and amendments thereto.

(e) All expenditures from the interstate water litigation fund shall be made in accordance with appropriation acts upon warrants of the director of accounts and reports issued pursuant to vouchers approved by the attorney general or a person designated by the attorney general.

(f) Unless the attorney general certifies to the director of accounts and reports as of June 30, 2001, that there is on-going litigation or preparation for litigation between the state of Kansas and another state, the federal government or an Indian nation to resolve a dispute concerning water, on July 1, 2001: (1) The director of accounts and reports shall transfer and credit all moneys in the interstate water litigation fund to the state general fund; and (2) the interstate water litigation fund shall thereupon be abolished.

82a-1803

CHAPTER 82A. – WATERS AND WATERCOURSES
ARTICLE 18. – WATER LITIGATION

82a-1803. Same; water conservation projects fund. (a) There is hereby established in the state treasury the water conservation projects fund, to be administered by the director of the Kansas water office.

(b) Revenue from the following sources shall be credited to the water conservation projects fund:

(1) Amounts provided for by K.S.A. 82a-1801; and

(2) moneys received from any source by the state in the form of gifts, grants, reimbursements or appropriations for use for the purposes of the fund.

(c) Moneys credited to the water conservation projects fund may be expended only for the purpose of paying all or a portion of the costs of the following water management, conservation, administration and delivery projects, and similar types of projects, in those areas of the state lying in the upper Arkansas river basin and directly impacted by the provisions of the Arkansas river compact between this state and the state of Colorado:

(1) Efficiency improvements to canals or laterals owned by a ditch company or projects to improve the operational efficiency or management of such canals or laterals;

(2) water use efficiency devices, tailwater systems or irrigation system efficiency upgrades;

(3) water measurement flumes, meters, gauges, data collection platforms or related monitoring equipment;

(4) artificial recharge or purchase of water rights for stream recovery or aquifer restoration;

(5) maintenance of the Arkansas river channel; or

(6) monitoring and enforcement of Colorado's compliance with the Arkansas river compact.

Moneys credited to the fund may be expended to reimburse costs of projects described by this subsection that were required by the division of water resources and commenced on or after July 1, 1994.

(d) Any person or entity may apply to the director of the Kansas water office for the expenditure of moneys in the water conservation projects fund for the purposes provided by this section. The director of the Kansas water office and the chief engineer of the division of water resources of the department of agriculture shall review and approve each proposed project for which moneys in the fund will be expended. In reviewing and approving proposed projects, the director and the chief engineer shall give priority to: (1) Projects that achieve the greatest water conservation efficiency for the general good; and (2) projects that have been required by the division of water resources. Upon such review and approval, the director of the Kansas water office shall request the legislature to appropriate, as a line item, moneys from the fund to pay all or a portion of the costs of the specific project, except that any project for which an aggregate of less than $10,000 will be expended from the fund shall not require a line-item appropriation.

(e) Interest attributable to moneys in the water conservation projects fund shall be credited to the state general fund as provided by K.S.A. 75-4210a and amendments thereto.

(f) All expenditures from the water conservation projects fund shall be made in accordance with appropriation acts upon warrants of the director of accounts and reports issued pursuant to vouchers approved by the

director of the Kansas water office or a person designated by the director of the Kansas water office.

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Defendant,

and

UNITED STATES OF AMERICA,

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On Exceptions To The Third Report Of The Special Master

KANSAS' REPLY TO BRIEF FOR THE UNITED STATES

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KANSAS' REPLY TO BRIEF FOR THE UNITED STATES

STATEMENT

The State of Kansas has filed one exception to the Third Report of the Special Master in this case ("Third Report"). That exception challenges the Special Master's recommendation that prejudgment interest not be awarded as part of damages incurred in the years 1950-1968 as a result of violations of the Arkansas River Compact by the State of Colorado. Colorado has filed four exceptions to the Third Report. Those exceptions challenge the Special Master's recommendations with regard to (1) the Eleventh Amendment, (2) the significance of the unliquidated nature of Kansas' claim in relation to prejudgment interest, (3) a balancing of the equities in relation to the amount of prejudgment interest and other damages, and (4) the Master's findings on crop losses. Both States have filed replies. In addition, the United States has filed its Brief for the United States in Opposition to the Exceptions of Kansas and Colorado ("U.S. Brief").

The United States opposes all of Colorado's exceptions except the evidentiary exception regarding crop losses, which it does not address. U.S. Brief 13-26. The United States supports inclusion of prejudgment interest in quantifying damages for breach of an interstate compact because it "is awarded not as a penalty, but as an element of compensation," and because not awarding interest in such cases could "result in an unjustified windfall for the offending State and undermine a potentially important incentive for States to comply with the

requirements of an interstate compact." U.S. Brief 26. Nevertheless, in the final three paragraphs of its brief, the United States opposes the Kansas exception, contending that the Special Master "has provided a sound basis for an award of prejudgment interest that reasonably balances the equities of each State." U.S. Brief 26-27.

The Court has allowed both States to file briefs in reply to the United States. This brief addresses only the United States' discussion relevant to the Kansas exception.

SUMMARY OF ARGUMENT

The United States' suggestion that it is appropriate to balance the equities in determining prejudgment interest is not consistent with the Court's precedents. The result of the United States' argument, if accepted by the Court, would be to deprive Kansas of an essential element of compensation for Colorado's breach of the Arkansas River Compact. Under similar circumstances, the Court has flatly rejected a balancing of equities as a means of determining an award of prejudgment interest. It would be unwise to depart from affording a complete remedy for a breach of contract in favor of an amorphous "balancing of the equities" analysis, especially in a case such as this, where one consequence would be to reduce the incentive that States otherwise have to honor their compact obligations. Moreover, to withhold prejudgment interest as the United States advocates would conflict with the Court's most recent analysis of remedies for violation of an interstate water allocation compact.

ARGUMENT

I. The United States' Position is Inconsistent with the Court's Rejection of Balancing the Equities as a Basis for Determining Prejudgment Interest.

In *West Virginia v. United States*, 479 U.S. 305 (1987), a contract enforcement suit by the United States against the State of West Virginia, the Court rejected a balancing of equities as a means of determining whether prejudgment interest should be assessed as part of the contract remedy in that case. The Court stated, "The District Court held that whether interest had to be paid depended on a *balancing of equities* between the parties; the Court of Appeals rejected such an approach, as do we." *Id.*, at 311, n. 3 (emphasis added); accord, *City of Milwaukee v. Cement Division, National Gypsum Co.*, 515 U.S. 189, 199 (1995) (rejecting arguments that prejudgment interest should be witheld on the ground that it would be "inequitable"). Although the United States cites *West Virginia v. United States*, U.S. Brief 21, n. 4, it offers no explanation for why a sovereign State such as Kansas should receive less compensation for a breach of contract with a State than the United States did there. The Arkansas River Compact "is, after all, a contract" between Kansas and Colorado. *Texas v. New Mexico*, 482 U.S. 124, 128 (1987). The adequacy of the compensation afforded for breach of a contract with a State should not vary with the identity of the plaintiff.

II. Balancing the Equities is Inconsistent with the Contract Remedy Adopted by the Court for Breach of an Interstate Water Compact.

The Court's leading case on remedies for breach of an interstate compact is *Texas v. New Mexico*, 482 U.S. 124 (1987). There, the Court held that the Court would provide a remedy for past breaches of compact obligations. *Id.*, at 128. The Court, observing that an interstate compact is a contract, explained that a compact "remains a legal document that must be construed and *applied in accordance with its terms.*" *Ibid.* (emphasis added) (citing *West Virginia ex rel. Dyer v. Sims*, 341 U.S. 22, 28 (1951)); accord, *New Jersey v. New York*, 523 U.S. 767, 811 (1998) (" '[U]nless the compact to which Congress has consented is somehow unconstitutional, no court may order relief inconsistent with its express terms,' . . . no matter what the equities of the circumstances might otherwise invite") (quoting *Texas v. New Mexico*, 462 U.S. 554, 564 (1983)).

Texas v. New Mexico thus confirms that the Court will not reweigh the equities that the compacting parties have balanced in adopting a compact, but that it will enforce a compact "in accordance with its terms." In that case, the Court rejected New Mexico's argument that it had acted in good faith and should therefore be relieved of its obligation to pay damages on account of its breach of the Pecos River Compact. Yet this is exactly the result that the United States urges, *i.e.*, that Colorado's good faith, its lack of knowledge or reason to know of its Compact breaches prior to 1969, should relieve it of a part of its duty to compensate Kansas. Although the Court did not explicitly reject a "balancing of the equities" approach, it effectively reached that result.

First, the Court stated firmly that it would provide a remedy "if the parties intended to make a contract and the contract's terms provide a sufficiently certain basis for determining both that a breach has in fact occurred and the nature of the remedy called for." 482 U.S., at 129 (citing Restatement (Second) of Contracts § 33(2), and Comment *b* (1981)).

Second, the Court drew a distinction between what was essentially an equitable remedy dependent on a balancing of equities, on the one hand, and a legal remedy in damages, on the other hand:

> "To order making up the shortfalls by delivering more water has all the earmarks of specific performance, an equitable remedy that requires some attention to the *relative benefits and burdens* that the parties may enjoy or suffer as compared with *a legal remedy in damages.*" 482 U.S., at 131 (emphasis added).

Thus, the Court distinguished the legal remedy of damages for breach of a compact from specific performance of a compact, which would require a balancing of the equities. The implication is strong, therefore, that in providing a legal remedy in damages, like the one that Kansas seeks here, the Court intended to exclude the balancing of equities normally associated with an equitable remedy. Indeed, the Court turned aside New Mexico's plea that its good faith should outweigh Texas' right to relief for New Mexico's past failures to perform:

> "There is often a retroactive impact when courts resolve contract disputes about the scope of a promisor's undertaking; parties must perform today or pay damages for what a court decides

> they promised to do yesterday and did not. In our view, New Mexico cannot escape liability for what has been adjudicated to be past failures to perform its duties under the Compact." *Id.*, at 129.

Colorado, like New Mexico, cannot escape liability for what have been adjudicated to be past failures to perform its duties under a compact. Yet this is exactly what Colorado is demanding and what the Special Master, and now the United States, have endorsed in recommending that prejudgment interest for the period 1950-1968 be withheld.

CONCLUSION

The Kansas exception should be sustained, and the Colorado exceptions should be overruled.

Respectfully submitted,

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STATE OF KANSAS,

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ARTHUR L. LITTLEWORTH, Special Master

FOURTH REPORT

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SECTION I

INTRODUCTION

Both states rested their respective cases on January 17, 2003, thus completing the final segment of the trial. This Fourth Report includes those trial proceedings, together with all other issues that remained after the Court's Opinion on my Third Report. *Kansas v. Colorado*, 533 U.S. 1, 150 L.Ed.2d 72, 121 S.Ct. 2023 (2001).

The final segment of the trial began on June 24, 2002, and consisted of 56 trial days, 40 witness appearances, primarily by experts, and the introduction of approximately 279 exhibits. The transcript for this trial segment consists of 8697 pages. The primary issues were:

(a) Whether there were additional depletions to usable Stateline flows for the period 1997-99. Total depletions for the period of 1950-96 had been previously determined to be 428,005 acre-feet. Third Report at 119.

(b) Whether Colorado's Measurement Rules for the determination of groundwater pumping are sufficient, considering a 1999 USGS Report.

(c) Whether numerous changes proposed by both states to the H-I model should be made.

(d) Whether Colorado's Use Rules, as implemented, are sufficient to ensure compact compliance.

(e) How to utilize the H-I model in the future in order to determine compact compliance.

(f) Whether a River Master should be recommended in order to monitor and enforce future compact compliance.

In addition, there remained the issues of calculating damages for 1950-94 in accordance with the Court's Opinion of June 11, 2001, and determining monetary damages for the additional depletions of 7935 acre-feet that occurred in 1995-96 and were not included in my Third Report, and for any depletions occurring thereafter.

Following the Court's June 11, 2001, Opinion on my Third Report, the states recalculated and agreed upon the figure of $7,059,595 as the amount of "nominal damages" in the years 1950-98 resulting from compact violations for 1950-94. This amount has not been adjusted for inflation. Appendix, Exhibit 1. Nominal damages represent the actual dollar values of the various damage components at the time a loss occurred. The states disagreed, however, on the calculation of prejudgment interest. I decided that issue by Order dated December 2, 2002, which is included in the Appendix as Exhibit 2 for review by the Court.

With respect to the calculation of monetary damages for the 1995-96 depletions of 7935 acre-feet, the states stipulated to the figure of $236,664 in 2002 dollars, together with prejudgment interest at the rate of six percent per year, simple interest, beginning on January 1, 2003, and prorated to the day of payment. Appendix, Exhibit 3.

This Fourth Report, therefore, addresses all of the issues remaining in the case, whether raised during the final trial segment or by motion in connection therewith.

SECTION II

PROCEDURAL HISTORY

The Supreme Court issued its first Opinion in this case (514 U.S. 673, 131 L.Ed.2d 759, 115 S.Ct. 1733) on

May 15, 1995, confirming my First Report and the fundamental finding that postcompact well pumping in Colorado had violated Article IV-D of the Arkansas River Compact. Article IV-D provides that upstream development in Colorado shall not cause material depletions of usable Stateline flows into Kansas. On remand, additional trial proceedings were held to quantify the amount of the shortage, and to assess Colorado's then current compliance with its compact obligations. The states stipulated that depletions for the period 1950-85 were 328,505 acre-feet, and I later found that additional depletions for the period 1986-94 amounted to 91,565 acre-feet.

My Second Report, filed September 1997, sought approval of these shortage determinations, and included recognition of Colorado's compact compliance efforts, together with rulings on several legal issues affecting a remedy. Exceptions were taken only by Colorado, and only upon two of the legal issues then determined. Colorado excepted to my ruling, (1) that prejudgment interest is not barred because of the unliquidated nature of the Kansas claim; and (2) that the Eleventh Amendment of the United States Constitution does not bar an award of money damages from being based, in part, on losses incurred by Kansas water users. Both Kansas and the United States opposed the Colorado exceptions. Rather than deciding the legal issues at that time, the Court overruled the exceptions without prejudice to Colorado's right to renew them at the conclusion of the remedy phase of the trial. 522 U.S. 1073, 139 L.Ed.2d 750, 118 S.Ct. 849 (1998).

On May 11, 1998, the trial resumed to consider depletions for the 1995-96 period, and to determine certain modeling issues which affected the amount of depletions. At the conclusion of this trial segment, I issued an order

on January 11, 1999, deciding the modeling and certain related issues, and ordering the states to rerun the H-I model in accordance with those decisions. This was done for the purpose of determining depletions to usable Stateline flow for the years 1995-96, and the results were presented in the form of Joint Exhibit 183. The states agreed that depletions for 1995-96 amounted to 7935 acre-feet, thus bringing the total depletions of usable Stateline flows from 1950 through 1996 to 428,005 acre-feet.

The remedy phase of the trial began on November 8, 1999, and was concluded on January 28, 2000. Almost all of the testimony related to money damages. Colorado had initially proposed repaying past depletions in water, but that proposal was virtually withdrawn. Having heard testimony on the proposal, I found that successful implementation of a water repayment program was too uncertain to be relied upon in a judgment, and that Kansas should be compensated for its past losses by monetary damages. Neither state filed exceptions to that recommendation.

Kansas analyzed its monetary damages in terms of four separate categories of costs or losses resulting from depletions of usable Stateline flows. These were: (1) additional costs incurred from pumping groundwater to replace depletions of surface water deliveries; (2) increased costs to pump groundwater in a larger regional area, both in the past and in the future, due to water level declines attributable to depletions of usable Stateline flows; (3) crop production losses on lands in the ditch service areas that were irrigated by surface water only, and did not have wells to replace depletions of Arkansas River flows; and (4) secondary or indirect economic losses to the Kansas economy resulting from the increased costs of pumping

and crop production losses. Colorado followed the Kansas approach to damages (subject to its Eleventh Amendment objection), and organized its response using the same categories. The economists for both states predicated their testimony, in part, upon a Stipulation of much of the necessary basic data, including total irrigated acres, acres irrigated by wells, depletions to groundwater recharge, shortages in crop irrigation requirements, crops planted, prices, etc. However, these data had been accumulated only through 1994, and thus the damage testimony reported in my Third Report was limited to the period from 1950 through 1994. It did not include depletions of 7935 acre-feet for 1995-96. However, the states have now agreed that damages for these depletions amount to $236,664 in 2002 dollars. Appendix, Exh. 3.

My Third Report on the remedy phase of the trial was filed in August 2000. I found as a matter of law that the Eleventh Amendment does not preclude damages awarded to Kansas from being based, in part, upon losses incurred by its water users, and that the unliquidated nature of Kansas' claim for damages does not bar an award of prejudgment interest. I also made recommendations on the methodology and data to be used in calculating the various categories of Kansas' damages. Moreover, I recommended that damages should bear prejudgment interest from 1969 when I found that Colorado knew, or should have known, that postcompact wells were causing material depletions of usable Stateline flows. Prior to oral argument on the exceptions to the Third Report, the states advised the Supreme Court that damages calculated on the basis of the Third Report came to approximately 38 million dollars. The Supreme Court issued its Opinion on my Third Report on June 11, 2001. 533 U.S. 1, 150 L.Ed.2d

72, 121 S.Ct. 2023 (2001). The Court affirmed all of my findings and recommendations, with the exception of the date for the commencement of prejudgment interest. While initially there appear to have been three separate views on the Court concerning prejudgment interest (533 U.S. 1 at 15, fn. 5), the Court ultimately ruled that prejudgment interest should run from the date of the filing of the complaint, namely, from 1985.

Following the Supreme Court's June 11, 2001 Opinion, an effort was made to settle the remaining issues in the case through mediation. The states submitted a joint motion for a partial stay of proceedings in order to devote sufficient attention and resources to mediation. The states explained that they had retained Joseph P. Mazurek, former Attorney General of the State of Montana, as their mediator, and had committed the personal efforts of the respective Attorneys General to that effort. Accordingly, a stay was granted until December 31, 2001. Unfortunately, the mediation effort was not successful, as stated in a Joint Report submitted January 3, 2002. A copy of that report is attached as Exhibit 4 in the Appendix.

Also following the Supreme Court's Opinion, Kansas sought permission by letter to submit to Colorado and the United States, presumably for use in the next trial segment, an analysis by Kansas experts on the need for replacement water "to offset future depletions of usable stateline flows caused by the Colorado Winter Water Storage Program." Kansas stated that this analysis was directed toward assessing "the additional replacement water necessary for compliance by Colorado in the future with the Arkansas River Compact." Both Colorado and the United States opposed the request. I rejected the proposed evidence, holding that the Winter Water Storage Program

had been fully considered in the liability phase of the trial; that Kansas had then failed to prove that the program adversely impacted Stateline flows; and that the case now concerns only the depletions from postcompact well pumping, and not the Winter Water Storage Program. A copy of this Order, dated July 25, 2001, is attached as Exhibit 5 in the Appendix for review by the Court.

During the course of the last trial segment, disagreements also surfaced over the calculation of prejudgment interest for the 1950-94 period. Kansas maintained that the Supreme Court's Opinion "left open" the question of whether prejudgment interest should begin to accrue on *all* damages existing as of 1985, or only upon the "additional damages" occurring after filing the suit in 1985. The difference between the states on this issue amounts to approximately 24 million dollars. Colorado contends that damages for the 1950-94 period, adjusted for inflation, and including prejudgment interest from 1985, amount to $28,998,366 in 2002 dollars. The corresponding Kansas calculation is $52,879,927. After the issue was briefed, I ruled in favor of Colorado by Order dated December 2, 2002, a copy of which is attached for the Court's review as Exhibit 2 in the Appendix.

Both states completed their evidence and rested their respective cases on January 17, 2003. Closing Briefs were filed on this final segment of the trial on March 24, 2003. My Fourth Report in draft form was submitted to the states on August 22, 2003, allowing comments to be received by September 30, 2003, and responses by October 8, 2003. After taking into account the submittals by both states, this Fourth Report was finalized.

SECTION III

1997-99 COMPACT COMPLIANCE

A. Use Rules.

One of the principal issues in this trial segment concerned the question of whether depletions to usable Stateline flows continued after the adoption of Colorado's administrative rules designed to regulate well pumping. These rules did not become fully effective until 1997.[1] Both states introduced evidence on compact compliance for the specific period of 1997-99.

Colorado's Administrative Regulations "Governing the Diversion and Use of Tributary Ground Water in the Arkansas River Basin" (Use Rules) were promulgated by Colorado's State Engineer in September of 1995, and became effective on June 1, 1996 after protest, trial, and approval by the Water Court. Colo. Exh. 1051, App. A; Kan. Exh. 1123. A copy of the Use Rules is included in the Appendix as Exhibit 6. These Rules were designed to protect surface water users in both Colorado and Kansas from upstream well pumping. Essentially all pumping is prohibited under the Rules unless replacement water is provided to protect senior surface water users in Colorado, and to provide appropriate Stateline flows for Kansas.

The direct protection for Kansas is found in Rule 3, which provides that all production of groundwater for irrigation use, from the valley-fill and surficial aquifers

[1] The Use Rules were adopted June 1, 1996, but for the remainder of 1996 only 60% of depletions were required to be replaced. Second Report at 61-66.

along the Arkansas River from Pueblo to the Stateline, "shall be totally discontinued" unless depletions to usable Stateline flows caused by such pumping are replaced pursuant to a plan approved by the Colorado State Engineer's Office. Kan. Exh. 1123, Rule 3.1; RT Vol. 222 at 82, 86. The only exceptions are the precompact wells which are allowed to pump 15,000 acre-feet annually in accordance with my First Report and the Court's ruling on the liability phase of the trial. Even these wells, however, are still subject to Rule 4, which requires that replacement water be provided in order to protect senior surface water rights in Colorado against depletions. Kan. Exh. 1123, Rule 3.3. The result is that precompact wells must also be included in an approved Replacement Plan.

Rule 4 responds to the protection of senior surface water rights in Colorado, although the Colorado State Engineer has testified that implementation of Rule 4 will also "protect the depletions to state line flow." RT Vol. 147 at 127. It has the "derivative effect" of benefitting Kansas. *Id.* at 130; RT 222 at 51-52; RT Vol. 224 at 124-25. If this should not be true, however, Rule 4.1 still provides that replacement water supplied to protect Colorado senior rights "shall not relieve a well user of an obligation to replace depletions to usable Stateline flows." Kan. Exh. 1123, Rule 4.1; RT Vol. 146 at 61.

The Use Rules establish certain "presumptive stream depletions" which are used in the augmentation plans to determine how much replacement water is required. Rule 4.2. For wells that provide a supplemental supply to flood and furrow surface water irrigation, 30 percent of the amount pumped is presumed to be a depletion to the stream. For wells that are the sole source of irrigation water, the presumed depletion is 50 percent. And for wells

that are the sole source of supply using sprinkler irrigation systems, the presumptive stream depletion is 75 percent of the amount pumped. *Id.* Presumptive stream depletions are to be reviewed annually, and revised if necessary to prevent material injury to senior surface rights in Colorado, and depletions of usable Stateline flows. Rule 4.3. Colorado's State Engineer described the presumptive depletion percentages as "approximations" designed to provide a "simple and easy way" to determine stream depletions. Colo. Exh. 1390 at 11-12. But he recognized, and the Use Rules require, that actual compact compliance be determined by using the H-I model. Rule 3.4. The presumptive depletion percentages were developed on the basis of average data, and do not vary with wet and dry years. Hence, in some years the percentage factors may cause over-deliveries, and in other years under-deliveries. RT Vol. 216 at 114.

Implementation of the Rules begins with an estimate of pumping for the following year, prepared by the several associations which represent water users along the river. Using the presumptive stream depletions, the amounts of required replacement water are calculated, and an augmentation plan for replacement water is then prepared and submitted to the State Engineer for approval. Rule 6. The approved plans are implemented on a monthly basis, estimating the current depletions and providing the amounts of replacement water required. RT Vol. 215 at 123-24.

B. Sources of Replacement Water.

A major portion of the water available for replacement originates on the western slope of the Rockies, and is

transported across the Continental Divide into the Arkansas River Basin through the Fryingpan-Arkansas Project (locally and sometimes herein referred to as "Fry-Ark" water). That is a federal project authorized by Congress in 1962. The water rights to the Project are held by the Southeastern Colorado Water Conservancy District, an agency created under Colorado law. RT Vol. 216 at 6, 8. The Conservancy District markets the water made available from the Project, and has the obligation to repay the Bureau of Reclamation for the costs of the Project. *Id.* at 8. The boundaries of the District include the Arkansas River downstream to the City of Lamar. Such transmountain water can be used only within the boundaries of the District, and therefore cannot be delivered into the Offset Account in John Martin Reservoir for delivery to Kansas. RT Vol. 216 at 46-47. On an annual basis, the District can import no more than 120,000 acre-feet, and the District generally takes "every drop" that is available. RT Vol. 216 at 18, 35. However, the drought in 2002 severely impacted transmountain supplies. While the District expected to import as much as 40,000 acre-feet in 2002, it received only about 8500 acre-feet. RT Vol. 216 at 19. Pueblo Reservoir is the main storage facility for the Fryingpan-Arkansas Project water, but storage capacity is also available in Turquoise Reservoir outside of Leadville, and in the Twin Lakes Reservoir. RT Vol. 216 at 25.

The Southeastern Conservancy District, acting through its Water Activity Enterprise, markets both "first use" Project water and the return flows from such use. RT Vol. 216 at 10, 14. Return flows are calculated, based on earlier studies, at 40 percent of the water applied to a first use. RT Vol. 216 at 14. Return flows represent water that is actually being introduced back into the river.

Besides releases of transmountain water from Pueblo Reservoir or other upstream reservoirs, replacement supplies come from several other sources. Water is purchased from the City of Colorado Springs and released from Lake Meredith, representing both transmountain sources and native water. Kan. Exh. 1093 at 18. Wastewater effluent is also purchased from Colorado Springs and delivered through Fountain Creek. Transmountain water stored in Pueblo Reservoir was also transferred to the Winter Water Storage Program account in Pueblo Reservoir for delivery into the river as a replacement supply for pumping. Kan. Exh. 1093 at 19. During this 1997-99 period of time, the most significant providers of replacement water upstream of John Martin Reservoir were the City of Colorado Springs and the Pueblo Board of Water Works. Kan. Exh. 1093 at 16.

In the reach of the river upstream from John Martin Reservoir, there were minor disagreements between the states over the credits claimed from some of the sources, but frequently the issue merely concerned whether the documentation provided by Colorado had been sufficient to verify the actual release of water. Admittedly, transfers of replacement water within reservoirs that include other waters and accounts, and calculating storage releases of replacement water as distinguished from other possible releases, are extremely detailed and complex. However, Colorado prepared a rebuttal report outlining all of the data that had been delivered to Kansas on these replacement water sources, and overall that showing appears to be satisfactory. Colo. Exh. 1408 at 28-33. Colorado indicates that it has always been prepared to provide additional documentation if requested, and that it continues to refine the documentation process for specific types of

replacement operations in response to questions raised by Kansas. Colo. Exh. 1408 at 33; RT Vol. 246 at 52-53, 59-60, 67-68. In general, Kansas had "much fewer problems" with the replacement water sources provided through the upstream Replacement Plans. RT Vol. 224 at 105-06.

Downstream of John Martin Reservoir, however, a principal source of replacement water comes from credits that result from the "dry-up" of lands historically irrigated by precompact surface water rights. In contrast to the amounts of replacement water provided to the river upstream of John Martin Reservoir, the dry-up amounts of replacement water claimed by Colorado generated numerous disputes among the experts.

C. Acquisition of Replacement Water Supplies.

Most of the farmers who have wells along the Arkansas River in Colorado are members of one of three associations. These associations have become the vehicles for preparing the Replacement Plans required by the Use Rules, and for acquiring replacement supplies of water. Kan. Exh. 1123, Rules 4, 6, 7. The Arkansas Groundwater Users Association ("AGUA") represents the farmers and other users in the upstream reach of the Arkansas River. It has a membership of about 268 farmers, including approximately 400 wells. RT Vol. 220 at 23, 37. Also in the upstream area, and as far east as John Martin Reservoir, the farmers and other users are also represented by the Colorado Water Protection and Development Association ("CWPDA"). That organization was formed in 1965 and included about 794 wells in its 2002 Replacement Plan, of which 680 were active. RT Vol. 220 at 120-121. Downstream

of John Martin Reservoir and to the Stateline, most farmers belong to the Lower Arkansas Water Management Association ("LAWMA"), which was organized in 1973. Its year 2002 Replacement Plan included 441 irrigation wells along the main stem of the river, of which 364 were active, as well as 21 municipal and commercial wells. RT Vol. 221 at 87.

All of these associations are nonprofit corporations organized under Colorado law, subject to assessments. Their Boards of Directors range from 7 to 11 members. Each association employs a general manager, a small office staff, and has legal and engineering assistance readily available. The general manager of CWPDA testified that he was in almost daily contact with his legal and engineering consulting firms. RT Vol. 220 at 154. Each of these associations has acquired a wide variety of replacement sources of water, as owners or under leases or other contractual arrangements. The State of Colorado has assisted in financing replacement supplies, recently increasing its loan ceiling to 3.5 million dollars in addition to funds already loaned. Colo. Exh. 1267 at 7. LAWMA has been loaned 6.5 million dollars by the state to purchase shares in the Highland Ditch and other companies, entitling LAWMA to surface water to be used for replacement of well pumping. Similarly, AGUA was loaned money by the state to purchase about a third of the total shares in the Excelsior Ditch Company. Colo. Exh. 1267 at 7; RT Vol. 221 at 97, 151-52.

AGUA's Replacement Plan for 2002 serves to illustrate how these associations function. In the fall of 2001 AGUA solicited its members for their pumping projections for the 2002 irrigation season. RT Vol. 220 at 37-38. Until 2002, which was a very dry year, AGUA had been able to

obtain sufficient replacement water to offset all of its members' pumping. RT Vol. 220 at 38. AGUA's replacement sources of water included shares purchased in the Excelsior Ditch Company, which provided water from certain "dry-up" lands; transmountain or other fully consumable water from the City of Pueblo; both first use and return flows of Fry-Ark project water; and return flows from the Cherokee Metropolitan District. Colo. Exh. 1384 at 16-20. Initially, AGUA indicated that in 2002 its members would be limited to 80% of their prior 5-year pumping average because of the shortage of available replacement water. But this projection turned out to be too generous. In February 2002, AGUA warned its membership that they might be cut to 50% of prior usage, and the cost of replacement water would be at least 50% higher than previous prices. Kan. Exh. 1134. A copy of this memo is included in the Appendix as Exhibit 7. The final pumping allocation in 2002 turned out to be 60% of prior use. RT Vol. 220 at 38-39. Farmers within AGUA are assessed equally for management, legal and engineering costs, and they must also pay an individual charge for the required replacement water attributable to each farmer's pumping. RT Vol. 220 at 43. A farmer must pay for the amount of water ordered, whether or not it is used. *Id.* at 45.[2]

[2] LAWMA is organized somewhat differently. LAWMA has a portfolio of replacement supplies, and each share of stock entitles the owner to a prorata amount of the total LAWMA supply. RT Vol. 221 at 155-56. A farmer's pumping is limited by his stock allocation. If he needs more water, he must obtain more shares, and there is an active trading market for shares of stock. RT Vol. 221 at 163-64. On average, one share of stock represents one acre-foot of replacement water. *Id.* at 161.

The AGUA 2002 Replacement Plan was prepared by its consulting engineers, a firm well experienced in water matters. Colo. Exh. 1384. After receiving the projected pumping estimates, the engineers used the presumptive depletion factors established by the Use Rules to determine a well head depletion for each well. RT Vol. 220 at 74-75. The presumed depletion for wells that are supplemental to surface water supplies was set at 30% of pumping; for wells that are the sole source of irrigation water, the presumed depletion factor was 50%; and for center pivot sprinkler systems, the presumed depletion was 75%. The engineers then utilized a groundwater accounting model developed by the Colorado State Engineer to determine the timing and location of such depletions. Kan. Exh. 1123, Rule 4.2; Rule 8; RT Vol. 222 at 30, 32-33. As a result, AGUA knew the specific location and amount of replacement water that had to be provided to the river each month. RT Vol. 220 at 87-89.

The AGUA 2002 Replacement Plan, which is about half an inch thick, contains a great deal of data on each of the 398 active wells: the owner's name, the state well ID, whether the well is active or inactive, the applicable depletion factor (i.e., 30%, 50%, or 75%), the location by quarter section, the state's well permit number, the case number for an adjudicated right, the appropriation date, and, finally, the amount of pumping requested multiplied by the presumed depletion factor to establish the estimated depletion for that well. Colo. Exh. 1384, App. A, C. The plan also uses the unit response functions, i.e., an input to the H-I model, to determine the "lag" effect, namely, the percentage of the depletions that will impact the river within the plan year, as opposed to those that will not be felt until the following year and will be replaced at

that time. RT Vol. 215 at 121-22; RT Vol. 220 at 89. The plan, of course, is a projection. Actual amounts of pumping, actual replacement water required, and actual amounts of replacement water provided, are determined on a monthly basis during the irrigation season. RT Vol. 215 at 123-24; RT Vol. 220 at 87-89. Both AGUA and the State Engineer's Office monitor pumping on a monthly basis. If pumping from a well exceeds its estimate, and replacement water is not available, the well is "red tagged," that is, it is shut down by the state. RT Vol. 220 at 41.

A summary of AGUA's 2002 plan shows that the total quantity of replacement water projected to be required for that year amounted to 12,627 acre-feet, and that total anticipated replacement credits for the year actually amounted to 13,001 acre-feet, or an excess credit of 373 acre-feet. A copy of Table 11 in Colorado Exhibit 1384, showing this accounting, is included in the Appendix as Exhibit 8. The submitted plan, of course, is subject to what actually occurs, both in terms of actual pumping and replacement water provided. The Colorado Division of Water Resources prepared end of the year reports which summarized the true performance of all the Replacement Plans for 1997-99. For example, see Colorado Exhibit 1315 for the 1999-2000 plans. Kansas makes the point that such reports are not required by the Use Rules, but this is a practice which should continue, and such reports should be distributed to Kansas.

D. Administration of Replacement Plans.

Proposed Replacement Plans must be filed by March 1 for the irrigation year that begins on April 1, and extend

through March 31 of the following year. There are presently 2130 irrigation wells in Colorado's database located within the valley fill and surficial aquifers of the Arkansas River between Pueblo and the Stateline. This is the area included within the H-I model area, and these are the wells that are subject to Rule 3 of the Use Rules. Of these 2130 wells, 858 have become inactive based on owners' affidavits, leaving 1272 considered as "active." Of the active wells, 1175 are included in Replacement Plans. The remaining wells have been tagged with Cease and Desist Orders and are monitored periodically to ensure that they are not in use, or have been included in Substitute Water Supply Plans. Colo. Exh. 1267 at 15.

During 1997-99, almost all of these active irrigation wells were included in the Replacement Plans submitted either by AGUA, CWPDA or LAWMA.[3] The AGUA, CWPDA and LAWMA Replacement Plans were all approved for the years 1997-99, subject to certain conditions that were tailored to each plan. The approval letters are found in Colorado Exhibit 1267, Appendix A. Copies were sent to Kansas. RT Vol. 222 at 62; RT Vol. 224 at 139. Each plan was required to show amounts of replacement water equal to projected depletions, even though the actual pumping might turn out to be less than estimated. RT Vol. 222 at 41. Where pumping was less than projected, some replacement sources like Fry-Ark return flows would

[3] The Use Rules also regulate pumping along the Arkansas River and its tributaries in areas outside of the H-I model domain. Replacement Plans are also required for wells in these areas. During 1997-99 the total number of Replacement Plans along the river ranged between 15 and 17.

nonetheless have been released to the river, and would result in excess credits. *Id.* at 42. Other replacement sources, such as water held in reservoir storage, would not have been released. *Id.* Replacement sources, like pumping, were estimated in the plans.

The procedures for determining depletions and required replacement water begin with pumping measurements, which are calculated monthly by the Colorado Division of Water Resources. The presumptive depletions under the Use Rules are then applied on a well-by-well basis, and the groundwater accounting model is used to lag the effects of such pumping back to the stream, both as to time and location. RT Vol. 222 at 29-32. Replacement supplies are generally provided to match the depletions when and where they occur. Beginning in 1996 the Division of Water Resources began holding monthly augmentation meetings to review actual pumping and amounts of replacement for the previous month, and to make estimates for the following month. Colo. Exh. 1267 at 3.

These meetings are attended by each of the well owner associations, and sometimes by Kansas representatives. RT Vol. 222 at 30-33. The data are sent to Kansas if its representatives should not attend. RT Vol. 222 at 33. A running account spreadsheet is kept on a monthly basis for each Replacement Plan. RT Vol. 224 at 59. An example of this monthly accounting is found in Kansas Exhibit 1140 for October 2001. The accounting keeps track of the river depletions by reach, the sources and amounts of replacement water by reaches, any excess replacement water credit that is to be carried over to the next month, the usability discount for Stateline deliveries, and a Stateline accounting. A "thick packet" of 50 or more pages of backup data to this summary spreadsheet is provided to

all parties, including Kansas. RT Vol. 224 at 86-87. Excess replacement deliveries are carried over on a monthly basis only. RT Vol. 222 at 43, 45. There is no procedure for carrying over credits into a future year. *Id*. at 44-45. It had been the Kansas position until this trial segment that even winter depletions could not be offset by over-deliveries in the prior summer. *Id*. at 45.

The amounts of replacement credits actually available from lands that have been dried up depend upon water availability during the plan year; that is, the amount of flow in the river that would have been available in priority for diversion pursuant to the ditch company shares held in the Replacement Plan. Colo. Exh. 1267, App. A; Mar. 26, 1999 letter to LAWMA, Condition 13; RT Vol. 224 at 140-41. At the end of each plan year, the Colorado Division of Water Resources prepares a summary report for each of the Replacement Plans showing what, in fact, has occurred. For the 1997-99 plans, these reports are found in Colorado Exhibits 1313, 1314, and 1315.

During the trial, Kansas raised the question of whether the approval of a Replacement Plan indicated unqualified acceptance of the amount of replacement credits shown in the plan. Clearly, Colorado does not administer the plans in this fashion. RT Vol. 223 at 13, 19-20. Indeed, the approval letter of the 1999 LAWMA Plan, for example, states that: "The effectiveness of this replacement plan in replacing depletions to usable Stateline flow will be evaluated at the end of the plan year to determine if any additional replacements are required. . . ." And following a listing of the proposed replacement sources, the letter further states, "The actual yields from the replacement sources listed above will depend on the actual water availability during this plan year. . . ." Colo. Exh. 1267,

App. A, Letter Mar. 26, 1999; RT Vol. 223 at 13, 19-20. Finally, Conditions 11, 12 and 13 provide that approval of the plan does not "guarantee" that the replacement water made available will protect senior surface water rights in Colorado or replace depletions to usable Stateline flows. If such replacement supplies are insufficient, the approval letter requires that additional supplies must be provided, or pumping curtailed. Colo. Exh. 1267, App. A, Letter Mar. 26, 1999. A copy of this letter, as an example of Colorado's procedure, is included in the Appendix as Exhibit 9.

E. Colorado's Results of its 1997-99 Replacement Plans.

Colorado's evidence showed that the amounts of replacement water provided as required by the presumptive depletion factors were in excess of the amounts necessary to offset Stateline depletions for each of the 1997, 1998 and 1999 years. Kansas disagreed with these data, although both states acknowledged that the final test of compact compliance lay with the results of the H-I model, and not necessarily with the Replacement Plan accountings. RT Vol. 222 at 53. It was the Kansas position that the presumptive depletion factors under the Use Rules did not accurately reflect consumptive use, and that the replacement water credits allowed by Colorado were too generous. RT Vol. 224 at 101-02.

Nevertheless, the Replacement Plans for 1997 estimated the so-called Rule 3 irrigation pumping within the H-I model area at 133,188 acre-feet. Colo. Exh. 1062 at 21. Actual pumping as determined by Colorado's Measurement Rules amounted to 112,025 acre-feet. Colo. Exh. 1267, Table 4-1 at 20; RT Vol. 222 at 40. Colorado claimed

credit for the delivery of 26,542 acre-feet of replacement water to replace out-of-priority depletions to senior surface water rights in Colorado, and an additional 10,486 acre-feet to offset depletions to usable Stateline flows. Colo. Exh. 1267, Tables 4-4, 4-5 at 23-24; RT Vol. 222 at 52. Stateline depletions under the Use Rules were determined to be 10,462 acre-feet, i.e., slightly less than the amount of replacement water provided.

The 1998 Rule 3 plans projected pumping to be 142,876 acre-feet, but Colorado concluded that only 96,123 acre-feet were actually pumped. Colo. Exh. 1267 at 28-29. Replacement water for senior surface water rights in Colorado was shown as 30,097 acre-feet, and Stateline replacements at 10,888 acre-feet. *Id.* at 32-33. Again, the Colorado evidence shows that the 1998 replacement water slightly exceeded Stateline depletions of 10,855 acre-feet, as determined by the Use Rules. Colo. Exh. 1267 at 32-33; Colo. Exh. 1314, Table 4.

In 1999 the estimated Rule 3 pumping in the Replacement Plans totaled 145,604 acre-feet, while actual pumping for the plan year was measured at only 87,105 acre-feet. Colo. Exh. 1267 at 36; Kan. Exh. 1093, Table 6. In addition to replacement water for Colorado's senior surface water rights (25,342 acre-feet provided contrasted with 21,500 acre-feet required), Colorado's evidence shows Stateline delivery replacements of 4676 acre-feet, against Stateline depletions of 3797 acre-feet, as calculated under the Use Rules. Colo. Exh. 1315, Tables 2, 3, 4; RT Vol. 222 at 104.

Kansas, however, did not accept Colorado's accounting of replacement supplies. Many of the Kansas objections to the Replacement Plan accountings centered around the

dry-up credits claimed by Colorado. Even Colorado acknowledged that the procedures to determine credits available from lands no longer receiving surface irrigation supplies had not been "as simple" as originally expected. RT Vol. 222 at 74. One of the problems was that the removal of surface water irrigation did not necessarily mean that all of the land was actually dried up. It might become irrigated by sole source wells. For example, a large tract of land was acquired by the Colorado Division of Wildlife, land that was previously irrigated by the X-Y Canal. While that canal system was entirely shut down, the Division of Wildlife still used wells to irrigate part of its property for wildlife habitat. RT Vol. 222 at 145, 152-53. The wells and associated land were then required to be included in LAWMA's Replacement Plan. Colorado's procedures to verify lands truly dried up now require mapping, engineering verification, and a final affidavit filed at the end of the irrigation season, but these procedures continue to develop. RT Vol. 222 at 74-75. Field inspections are made, sometimes in the company of Kansas representatives. RT Vol. 222 at 76-78; Colo. Exh. 1267 at 26; Colo. Exh. 1322, 1323. Kansas believes that these procedures would benefit from still further improvement, including "monumenting" the dried up fields. Kan. Exh. 1093 at 20, 25. This may well be true, and may be required when Colorado Water Court approval is sought to transfer the use of a water right for replacement purposes. Colo. Exh. 1468. If there are replacement water sources that do not require Water Court approval, sufficient procedures should be in place to allow Kansas and others to efficiently and clearly monitor results.

Determining the credits available from dried up lands also requires an analysis of the amount of surface water

that would have been available to that land under Colorado's priority system, the actual flows in the river, and the consumptive use of that water. It is only the consumptive use of water that is "saved" and thus becomes available as a replacement supply. RT Vol. 221 at 131. Colorado has continued to develop a methodology for determining the consumptive use credit for each of the direct flow replacement sources. RT Vol. 223 at 36; RT Vol. 222 at 65-66. Initially, Colorado used the 1996 data from the H-I model approved in my Second Report, but these values have now been refined. RT Vol. 223 at 21-22. One revised consumptive use analysis submitted by LAWMA was found to be "wanting" and was not used by Colorado. RT Vol. 223 at 18. Colorado acknowledged that appropriate consumptive use factors will be ultimately determined by the Colorado Water Court. RT Vol. 222 at 66; RT Vol. 223 at 37.

F. Kansas' H-I Model Results for 1997-99.

Both states used the H-I model to address the question of whether the replacement supplies provided by Colorado during the 1997-99 period were sufficient to offset the depletions to usable Stateline flows. The states were in agreement on much of the data required for the model update, including the amount of well pumping in each of the three years.[4] RT Vol. 234 at 26, 28-29; Kan. Exh. 1093, Table 6. The data prepared by Colorado on

[4] Approximately 119,000 acre-feet for 1997; about 97,000 for 1998; and 87,000 acre-feet for 1999. These totals compare with long-term average pumping of approximately 145,000 acre-feet per year. Kan. Exh. 1093 at 14; Colo. Exh. 1408, Table 6.

precipitation, tributary inflows, and transmountain and project deliveries to canals were also accepted by Kansas for use in the model analysis. Kan. Exh. 1093 at 47.

Kansas, however, disagreed with Colorado's 1998 acreage study, and used a total of 261,030 irrigated acres in its model analysis, while Colorado used only 252,802 acres. Kan. Exh. 1093, Table 1. Both of these totals reflected a decrease in irrigated land from the 1995-96 total of 267,985 acres. Kan. Exh. 1093 at 8. The states had agreed upon those 1995-96 figures. There was also disagreement over the amount of replacement credits that should be allowed during the 1997-99 period. Specific figures can be found in Table 7 of Kansas Exhibit 1093, but in its H-I model analysis, Kansas rejected about 8000 acre-feet of the replacement credits claimed by Colorado. Kan. Exh. 1093, Table 7. Later during the trial, Kansas acknowledged that about 2700 acre-feet of the rejected credits should have been allowed, but the model results do not reflect that change. RT Vol. 234 at 54-57.

Kansas also modified input to the H-I model in the calculation of potential evapotranspiration ("PET"). In all prior uses of the H-I model, the PET had been determined using the Modified Blaney-Criddle formula. Kan. Exh. 1093 at 12. However, because of recent professional developments, Kansas concluded that the standardized form of the ASCE Penman-Monteith equation should be used instead of Blaney-Criddle, and Kansas made this change. *Id.* The effect of using Penman-Monteith is to increase Stateline depletions. This became a major issue in the case, and it is discussed in Section VI.

Kansas also reclassified acreages in farms having lands with supplemental well water available, and the

lands that did not receive well water. The purpose was to provide a uniform distribution in the model of the combined supply of well water and surface water on these lands. Kan. Exh. 1093 at 11. The effect was to increase the acreage modeled as receiving groundwater from 95,000 to 110,000 acres, and to increase depletions. Kan. Exh. 1093 at 11; RT Vol. 233 at 140; RT Vol. 237 at 140-42; RT Vol. 242 at 24-26. As discussed in Section V, I rejected that model change.

Kansas makes the point, which is not insignificant, that the 1997-99 period was "wet," and should not be used to judge more normal hydrologic periods. RT Vol. 234 at 27; RT Vol. 246 at 27, 31. River inflow at Pueblo during 1997-99 was about 40% above average, and precipitation was approximately 30% above average. Kan. Exh. 1093 at 6; Colo. Exh. 1408, Table 1. John Martin Reservoir spilled in 9 months out of 36, and indeed, Colorado lost credit for 11,607 acre-feet of water that had been stored in John Martin Reservoir for the benefit of Kansas. RT Vol. 234 at 131-32; Kan. Exh. 1093, Table 9. Total Stateline flows (as distinguished from usable flows) averaged 182,084 acre-feet over the 1986-94 period, but increased to 365,342 acre-feet over 1995-99. Colo. Exh. 1408, Table 2. Kansas argues that because of the increased river flows, Colorado's pumping was down by some 40% of the long-term average, and it could be expected that Stateline depletions would be less. Kan. Exh. 1093 at 6; Colo. Exh. 1408, Table 2. Consequently, Kansas urges that the H-I model results for 1997-99 "should not be used as an indicator of the adequacy of the Use Rules in preventing usable depletions over the long term." Kan. Exh. 1093 at 6. Kansas' expert testified that the 1997-99 results were more a result of hydrology than the effectiveness of the Use Rules. RT Vol.

237 at 43-44. It should be noted, however, that the years following 1999 were not wet. In fact, 2002 was probably the driest year in recorded history. RT Vol. 215 at 92-95. During this period, pumping has been equally low, curtailed not because water was not needed, but because replacement water was simply not available. RT Vol. 215 at 92-94; RT Vol. 246 at 120-21. A longer period of time will be required in order to evaluate fully the effectiveness of the Use Rules, but they may have performed as intended; that is, either to provide sufficient replacement water when it is available in order to offset depletions, or to limit pumping when sufficient replacement water cannot be obtained.

It is Kansas' position, however, that the current Use Rules, as implemented, are not adequate to achieve compact compliance. They cite three primary reasons. RT Vol. 241 at 119-25. The first reason relates to the presumptive depletion factors, which were developed using the 1950-85 version of the H-I model. *Id.* at 120. The later versions of the model would produce higher depletion factors, according to Kansas' long-time expert, Dale Book. *Id.* at 120-21. Additionally, Mr. Book believes that less water will be pumped in the future, and will be used more efficiently than older versions of the model assumed. *Id.* at 121-22. Kansas' second objection concerns the usability discount which does not require full replacement for depletions downstream of the Buffalo headgate which is about 20 miles from the Stateline. *Id.* at 123-25. The third reason concerns the credits allowed for direct flow sources, primarily for the X-Y and Sisson-Stubbs Canals. *Id.* at 125.

In the final analysis, however, compact compliance is not to be judged on the basis of the Use Rules, but on the results of the H-I model. It has long been the Kansas

position that the H-I model is reliable on an annual basis, and compact compliance should be judged on annual model results. The Kansas H-I model results are shown, by month, for 1997-99 in Table 14 of Kansas Exhibit 1093. A copy of that Table is included in the Appendix as Exhibit 10. Accretions shown in that Table represent Stateline flows in excess of depletions for the month. Accretions which meet the criteria to be considered "usable" are also shown separately from total excess flows. For reasons that only engineers can appreciate, a positive number in the Table reflects a depletion, while a negative number with a minus sign shows an accretion, i.e., an excess delivery. It should also be remembered that the timing of accretions, as well as depletions, are in part artifacts of the modeling process, and the results are not likely to be exactly replicated in actual operations. First Report at 262-63.

Viewing those Kansas model results, usable Stateline flows exceeded depletions in 1997 by 2673 acre-feet, and in 1999 by 2556 acre-feet. Only in 1998 does Kansas show a shortage of 2410 acre-feet. Over the whole three-year period the Kansas model does not indicate a shortage, but rather shows that usable accretions exceed depletions by 2819 acre-feet. RT Vol. 241 at 47-48, 129-31; Colo. Exh. 1411, Table 7c. Yet Kansas concludes from these monthly calculations that Colorado is still short by 6650 acre-feet over the whole 1997-99 period. Its analysis requires that accretions be allowed to offset depletions only within a "season," i.e., accretions during the summer irrigation season cannot be used to offset depletions in the winter. Kan. Exh. 1093 at 48. For example, in the summer of 1997 usable Stateline flows increased by about 7500 acre-feet while depletions in the following winter were about 4700 acre-feet. RT Vol. 241 at 49-50. Yet the Kansas model

analysis gives Colorado no credit for the summer increase as an offset against the winter decrease. It was the Kansas position that such seasonal accounting was in accord with past practice. However, the Kansas Chief Engineer finally acknowledged that extra water in the summer was more valuable to Kansas than in the winter, and he agreed that accretions in the summer should be allowed to offset depletions in the following winter. RT Vol. 241 at 52-53; see also RT Vol. 241 at 129.

G. Colorado's H-I Model Results for 1997-99.

In preparation for this trial segment, Colorado developed a version of the H-I model referred to as its "Test Model." Colo. Exh. 1353 at 1-2. This new version included some 17 changes to the prior model code, and was calibrated over 1970-94, a shorter and more recent period than had been previously used to calibrate the H-I model. Colo. Exh. 1411 at 1; RT Vol. 260 at 84-85. These changes were made to the version of the model that had been used earlier to calculate depletions for 1995-96. That version was often referred to as the "approved model" since it had been the subject of my Second Report. Dewayne Schroeder, Colorado's long-time employee and modeling expert, then extended the Test Model from 1994 through 1999 to reflect the operation of Colorado's Replacement Plans, its 1998 acreage study, and other data input. Colo. Exh. 1353 at 2. This model was called Colorado's "Updated Model," and was the model used by Colorado to determine compact compliance for the 1997-99 period. Colo. Exh. 1353 at 15-20; Colo. Exh. 1411.

The first model results prepared by Mr. Schroeder showed that usable accretions to Stateline flows exceeded

depletions over the 1997-99 period by 37,596 acre-feet. Colo. Exh. 1358, Table 7; Colo. Closing Br. at 98-99. Revisions made "in response to comments by the Kansas experts" reduced these excess deliveries to 19,523 acre-feet.[5] Colo. Exh. 1411, Table 7a; RT Vol. 260 at 9-13, 20; Colo. Closing Br. at 99. All of the Colorado modeling results rejected the notion of a "seasonal" accounting, i.e., that accretions could offset depletions only within the same irrigation season. It is true that the past accounting had been done on a seasonal basis pursuant to a compromise agreement between the states, but this procedure related to model offsets before the time when actual replacement water was being added to the river. Colo. Exh. 1353 at 21-22; RT Vol. 237 at 21, 25-26. Kansas did not indicate that this early agreement still controlled, and I find that it should not. RT Vol. 241 at 52-53, 129, 133.

The Colorado Test Model was designed not only to assess compact compliance for the years 1997-99, but also to test the effectiveness of the Use Rules into the future. Both states introduced modeling evidence on "prospective compliance," i.e., using different versions of the H-I model to forecast whether the Colorado Use Rules would provide sufficient replacement water in the future to assure compact compliance. These modeling efforts are discussed in Section IX. It is not necessary, however, to analyze the modeling changes made by both states in order to evaluate compliance for 1997-99. For this purpose, the Kansas

[5] Schroeder produced another model run, calibrated over 1950-94, instead of 1970-94, that showed excess deliveries of 12,523 acre-feet. Colo. Exh. 1411, Table 7b.

results can be used, and it is unnecessary to rely upon the excess deliveries shown by the Colorado Updated Model.

H. Conclusions.

In its Opening Post-Trial Brief, Kansas indicates that depletions for the 1997-99 period amount to 6650 acre-feet, determining net depletions and accretions on a seasonal basis. Kan. Op. Br. at 55. However, based on its own testimony that summer season accretions should offset winter depletions, Kansas submits a reduced claim of 1809 acre-feet, with a credit of 1441 acre-feet to be applied against any depletions occurring after December 1999. Kan. Op. Br. at 56. Whichever claim is examined, Kansas' use of the H-I model to achieve these results depends upon accepting the model results as being reliable on a seasonal basis. It has always been the Kansas position that the H-I model was reasonably reliable on an annual, and even on a seasonal or monthly basis. RT Vol. 243 at 118-21. And with equal consistency, this view has always been opposed by Colorado.[6] RT Vol. 215 at 135; RT Vol. 231 at 40-41; Colo. Exh. 1412 at 1-2, 6-8, 11. However, I cannot agree with Kansas' position on the model's accuracy. In using the H-I model results, I find that some measure of annual averaging is necessary in order to produce reasonably reliable compliance figures. There is an abundance of evidence in the record to support this conclusion, just as there is also much expert testimony to support the Kansas view. However, a benchmark in determining the H-I model's

[6] Schroeder testified for Colorado that he did not consider even his own H-I model analysis of depletions and accretions to be accurate on a monthly, seasonal or annual basis. Colo. Exh. 1353 at 19-20, 23.

accuracy is found in its ability to predict stream diversions. RT Vol. 236 at 104. The model's recent performance in this regard must make one wary of accepting single-year outcomes, recognizing that the effect of under-predicting diversions is to increase Stateline depletions. The model predicted only 77.6% of observed diversions in 1995; 80.4% in 1996; 87.4% in 1997; 96.5% in 1998, and 91.6% in 1999. Colo. Exh. 1412, Table 1 at 34. Over the whole 1950-99 period, we see that total diversions have been over-predicted by as much as 22.2% in 1960, and under-predicted by as much as 22.4% in 1995. *Id.*; Kan. Exh. 1113. Accordingly, looking at the 1997-99 period as a whole, and taking into account the replacement water provided and the model accretions, I find that Colorado is not in violation of the Arkansas River Compact during the 1997-99 years.

I also conclude that the Use Rules, as implemented during 1997-99, were sufficient to assure compact compliance. However, these were wet years, and it remains to be seen whether they will perform satisfactorily over a longer period of time including average and dry years. The Use Rules themselves cannot be faulted since they prohibit all postcompact pumping unless adequate replacement water is provided at the Stateline. If the 30%, 50% and 75% presumptive depletion factors should not prove to be adequate, the Use Rules provide that they may be changed, or that additional replacement water be provided. In the final analysis, therefore, it is the implementation of the Use Rules that becomes determinative of compact compliance.

SECTION IV

MEASUREMENT OF COLORADO'S WELL PUMPING

When Kansas sought to file this suit at the end of 1985, the action was targeted principally at the many new wells that had been drilled in Colorado after the 1949 compact became effective. Yet there was little good data on the number of wells then in operation, where they were located, or how much water they pumped. In the early years there had been no state regulation of Colorado wells. They could be constructed without state permission, and pumped without reports to anyone. In the liability phase of this trial, when pumping figures were essential, both states sought to estimate pumping from electric power records, although these data were neither complete nor consistent. In addition, many wells were not powered by electricity, but used either natural gas or diesel engines. It is not surprising, therefore, that the pumping estimates of the states varied considerably. For the period 1950-85, Kansas estimated that pumping along the Arkansas River averaged 161,394 acre-feet per year, while the Colorado average was 145,200. First Report, Vol. 2 at 202-03. In the trial segment on depletions for the period 1986-94, Kansas initially estimated average pumping at 151,114 acre-feet per year, compared to Colorado's average of 137,665 acre-feet. However, Kansas agreed as a compromise to use the Colorado pumping data in its model analysis for that period, but specifically withheld approval of the Colorado methodology for the future. Second Report at 12.

In March of 1994, the Colorado State Engineer adopted rules and regulations governing the "Measurement of Tributary Groundwater Diversions Located in the

Arkansas River Basin." ("Measurement Rules.") These rules became effective July 15, 1994, after approval by the District Court Water Division 2 in Case No. 94CW12. Colo. Exh. 1018, p. 14, App. B. By July of 1996, over 2000 wells within the H-I model domain were in compliance with the Measurement Rules.

A. Current Measurement Rules.

In 1996 the Colorado State Engineer proposed, and the Water Court approved, certain amendments to the Measurement Rules which became effective on June 1, 1996. Colo. Exh. 1019 at 12; Colo. Exh. 1051 at 4-6. The current form of the amended Measurement Rules is found in Kansas Exhibit 1122, and included in the Appendix as Exhibit 11. Also in 1996, the Colorado State Legislature enacted SB 96-124 requiring power companies to transmit directly to the State Engineer the records of energy used to pump groundwater. Colo. Exh. 1051 at 3. The Measurement Rules apply to all wells located in the Arkansas River Basin, not only to irrigation wells. All such wells must be equipped with either a totalizing flow meter, or be rated to determine a power coefficient. Rule 3. The power conversion coefficient, or PCC, is the number of kilowatt hours required to pump one acre-foot of water. Colo. Exh. 1331 at 9. The PCC method of calculating pumping depends first upon the amount of electricity used by a well, and those data are supplied directly to the State Engineer by the power utilities. Second, a pump test must be made on each well to determine the appropriate power coefficient. Rule 3.2. A re-rating of power coefficients is required whenever a change is made in the well, or at least every four years. Rule 3.5. The budgets and assessments of the

three major well associations along the river all provide for regular PCC testing.

Kansas has always maintained, however, that the PCC method of determining pumping is not sufficiently accurate, and that the Measurement Rules should be amended to require the installation of totalizing flow meters on all wells. At the present time, about 25% of the pumping is measured through such meters. Kan. Exh. 1093 at 14; RT Vol. 215 at 154-55. Kansas points out that meters are required along the Arkansas River in Kansas, and that meters have been installed on more than 15,000 wells in the whole State of Kansas. RT Vol. 162 at 97; RT Vol. 240 at 102. Totalizing flow meters have also been required in the Pecos River Basin in New Mexico and in the Upper Republican Natural Resource District in Nebraska. RT Vol. 162 at 75, 115-16; RT Vol. 163 at 47. The PCC methodology, however, provides the Colorado State Engineer with assured monthly pumping data, and it is also less expensive to farmers. RT Vol. 168 at 37-38; RT Vol. 216 at 82-84; Second Report at 53-54. The real issue at hand is simply whether the PCC method is sufficiently accurate to provide pumping data for the H-I model.

B. USGS Study.

In order to deal with ongoing Kansas concerns about the accuracy of the PCC method, Mr. Simpson, the Colorado State Engineer, asked the United States Geological Survey to study the issue. RT Vol. 215 at 99-108. Specifically, Mr. Simpson asked the USGS "to independently evaluate the PCC method, as it is used in Colorado, for the Arkansas River Basin and how it is used within the H-I Model." RT Vol. 168 at 45. The objective of the study, as

stated in the USGS proposal, was to "determine whether ground-water pumpage estimates for the study area using the PCC method, as applied by the State of Colorado, are statistically different from ground-water pumpage determined using TFMs [totalizing flow meters], and if so, determine the percent difference." Colo. Exh. 1062, App. F at 2.

The USGS report, which is Colorado Exhibit 1331, compares the two measurement approaches for the year 1998. Initially, 1300 irrigation wells were identified in the model area, but this number was reduced to 800 under the criteria that a well had to be active, electrical, and had reported recent pumping. Colo. Exh. 1331 at 6. A computer program was then used to "randomly select" one primary and four alternative sites for each potential well in the study. *Id.* After further evaluation, 103 wells were finally included in the study. *Id.*; RT Vol. 216 at 69-70. A new PCC test was performed in 1998 on each of the study wells, which were also equipped with totalizing flow meters. The results were compared from two to four times during the year. RT Vol. 215 at 101-02; RT Vol. 216 at 76.

The study concluded that about 80% of the difference in pumpage between the TFM and PCC approach was less than 10%, and that the overall mean difference in pumpage was only 0.01%. Colo. Exh. 1331 at 38. This indicates, reported the USGS, that there was "no significant difference on average between pumpage as measured by TFMs and pumpage as computed by the PCC approach." *Id.* It should be noted, however, that the Kansas expert, Steven P. Larson, testified that this was not an arithmetical calculation reflecting the actual difference in pumping measurements, but rather was the result of a statistical model. Kan. Exh. 1096 at 3. The USGS study also concluded that there

is a 95% probability that the difference in aggregated pumpage between the TFM and the PCC approach, for any given year, for 1000 wells, would be between -1.71% and -0.11%. Colo. Exh. 1331 at 39.

Through cross-examination and the testimony of Mr. Larson, Kansas established the fact that the USGS study did not fully achieve its original objective. Colo. Exh. 1331 at 33-34; RT Vol. 242 at 143-44, 153-54. The study compares new PCC coefficients and meter measurements only within a single year. It does not address the issue of whether PCC measurements can be relied upon, as the measurement rules provide, for as long as four years. RT Vol. 215 at 164, 173; RT Vol. 242 at 143-44, 150. Mr. Simpson agreed that further study is needed. RT Vol. 216 at 58. The PCC rating can be affected over time by the efficiency of the pump, and by changes in water levels. If water levels drop, more power is required to pump the same amount of water, and conversely, less power if water levels rise. Colorado did introduce a limited study comparing pumping results from the new USGS 1998 PCC measurements with those previously used by Colorado in 1997. Colo. Exh. 1332. The study found that the 1998 results were only 1.6% higher than the 1997 estimates. *Id.*, Fig. 1. This limited evidence also showed that both the 1997 and 1998 PCC methods calculated pumping that was slightly higher than the totalizing flow meter results on the same wells. *Id.*, Fig. 2.

Kansas, however, challenged the USGS study results, even within the same year. It argued strenuously that the 103 wells finally used were not representative of all the wells in the model domain. RT Vol. 215 at 169-70; RT Vol. 216 at 67-75. Mr. Larson testified that the well selection

was not random. RT Vol. 242 at 158. From USGS depositions, he said Kansas had learned that 800 potential sites were not used when 60 well sites were selected for 1998; rather, that a second list of 480 sites provided by Colorado was used. RT Vol. 242 at 157. Kansas also objected to many of the wells that were excluded, but in particular to the elimination of complex wells operating under a variance. *Id.* at 163-64. A complex well, defined in Rule 2, discharges at more than one point. At times, the farmer might pump the well straight into an irrigation ditch, and at other times into a gated pipe. Or he might always pump into a pipeline, but discharge at varying distances from the well. RT Vol. 215 at 139-40. The rules require that two PCC measurements be made for complex wells, one under the maximum head, and one under the minimum head, with a registered engineer determining what PCC value should be used. Rule 3.6. However, under the variance procedure, only one measurement may be used, but this must be at the discharge point closest to the well. This is the point of least friction, producing the lowest PCC rating, which in turn tends to slightly overstate pumping. RT Vol. 215 at 142, 151, 153, 158; RT Vol. 216 at 127, 132; RT Vol. 243 at 47-48. Approximately 25% of the total pumping comes from complex wells operating under a variance, but the evidence does not show that the PCC method employed on these wells operates to the detriment of Kansas. RT Vol. 217 at 16.

The USGS report specifically states that the test wells were randomly selected through a computer process, and it is difficult to believe that a USGS study would invalidate its results through a biased selection process of the test wells. Kansas, however, points to the deposition testimony of one of the authors of the USGS study. At the

very end of that deposition, the witness was asked if he had made a determination as to whether the wells finally selected were representative of the total population of wells in the valley. Kan. Exh. 1098 at 144; RT Vol. 216 at 72, 74. The witness replied that he had not made such a determination. *Id.* However, that single question and answer were never pursued, and the witness' response is not the same as saying that the wells finally selected were not representative, nor that the random selection process used did not produce a representative selection.

Throughout this trial, the amounts of pumping have been determined by both states using principally the PCC methodology. Pumping data in the H-I model are aggregated by ditch, not on a well-by-well basis. The evidence is clear that use of the PCC methodology is adequate for purposes of the H-I model when the pump has been recently tested. The real issue with respect to the Measurement Rules is whether the PCC rating should be retested more often than once every four years. On that issue, Colorado is now engaged in Phase 2 of the USGS study. Four years of data through the end of the 2002 irrigation season have been collected, and the USGS will analyze that data and submit a second report, expected to be published toward the end of 2003. RT Vol. 216 at 65-66. The purpose of the Phase 2 study is to determine the multi-year variability of the PCC methodology, and the Colorado State Engineer has testified that the Measurement Rules will be amended if the USGS concludes that the four-year period is too long. RT Vol. 216 at 74, 77.

There was also evidence, although contested by Kansas, that the amount of pumping may no longer be the most important data input to the H-I model. Mr. Simpson was pressed persistently on this point during cross-examination,

but held to his view that the amount of irrigated land and the distribution of groundwater on that land are more important in determining Stateline depletions than the amounts of pumping. RT Vol. 215 at 133-34; RT Vol. 216 at 120-121; RT Vol. 217 at 19-20. The amount of irrigated land and the distribution of groundwater became major issues in this trial segment, and are discussed in Section V. It should be noted, with regard to the amount of pumping, that Kansas accepted the Colorado pumping data for 1997-99, essentially as determined by the Measurement Rules, namely, 119,434 acre-feet for 1997; 96,749 for 1998; and 87,105 for 1999. RT Vol. 234 at 26, 28-29; Kan. Exh. 1093, Table 6; RT Vol. 244 at 97-98.

C. Conclusions.

The Colorado data system to identify and locate wells, and to determine the amounts of pumping and the use of such groundwater, continues to be steadily refined and improved. I believe that Colorado is acting in good faith to develop reasonably accurate data as necessary for compact compliance. Moreover, the weight of the evidence supports the conclusion that the Colorado system for determining pumping for use in the H-I model, taking into account the commitment to the results of Phase 2 of the USGS Study, is adequate. The value of monthly power records supplied to the State Engineer directly by the utilities, and the ability to estimate pumping on a monthly basis, can hardly be overestimated. Those data are essential to the administration of the Replacement Plans on a monthly basis. Accordingly, I conclude that it is not necessary in this case to require the installation of totalizing flow meters on all of the wells within the H-I model domain.

SECTION V

COLORADO'S 1998 IRRIGATED ACREAGE STUDY

In determining Stateline depletions, the H-I model is sensitive not only to the amount of well pumping, but also to the number and location of wells, to the number of wells which are active, and to the assumed distribution and use of pumped groundwater. Yet in the past, because of the lack of reliable data in regard to the use of groundwater, the H-I model has been required to use certain simplifying modeling assumptions. RT Vol. 218 at 77; RT Vol. 217 at 44. To remedy this, Colorado in 1998 undertook a comprehensive study of the irrigated acreage within the model area, with the aim of improving model results. RT Vol. 218 at 77-78, 91.

A. The GIS System.

The Colorado study began with maps prepared earlier by George Moravec. These maps were based upon 1985 aerial photos of the farms within the model area. Colo. Exh. 1268 at 4. The Moravec farm field boundaries were then digitized into field "polygons" to establish a Geographical Information System ("GIS"). Colo. Exh. 1408 at 9. Additional aerial photographs for later years were also used. *Id*. The digitizing process essentially takes the field boundaries from the aerial photos and puts them into a computer-readable form. RT Vol. 217 at 36. A computer polygon represents a farm field. RT Vol. 217 at 52. Originally there were approximately 7100 polygons, but after reviewing data provided by Kansas, the total number was increased to 7578. Colo. Exh. 1408, Table 3 at 78. Transforming the aerial photographs into the GIS computer system allows the inclusion and storage of relevant data

associated with a specific field, including well identification numbers, well locations, and recent pumping amounts. RT Vol. 217 at 51-53, 55-56, 119; Colo. Exh. 1275. The GIS system also produces a map of each farm unit. Samples are found in Colorado Exhibit 1274A, B, C, D, E; RT Vol. 217 at 110. By the time of trial, both states were using the same GIS database and were in agreement on the polygon boundaries and the total farm acreage within the model study area. RT Vol. 241 at 138-39; Colo. Exh. 1408 at 10-11. The states were also in agreement upon the assignment of fields to the different canal systems, and as to those fields irrigated by groundwater only. RT Vol. 241 at 139-40. Mr. Book, the Kansas expert, agreed that with the modifications made by Colorado that "we now have a very accurate set of information on the fields irrigated in the Arkansas River Valley in Colorado." *Id.* at 140.

B. Satellite Imagery.

Colorado used satellite imagery to classify the field polygons in the GIS system as either irrigated or nonirrigated. Use of satellite imagery is now being "commonly used" as a method to replace aerial photos. RT Vol. 217 at 42-43, 53, 68. The satellite process allows land to be classified without having to visit the parcel several times a year. A satellite signal is transmitted to the earth and the reflected values detect greenness, brightness, wetness, and other features that allow the land to be classified in various ways. RT Vol. 217 at 42-43. In this study, Colorado purchased August 1998 satellite imagery from the Bureau of Reclamation, and then contracted with a private specialty company, Logicon Space Imagery Incorporated, to evaluate the reflected signals and to make the classifications of either

irrigated or nonirrigated land. RT Vol. 217 at 58-61. The resolution of the satellite imagery used was 30 meters by 30 meters, or approximately 1/4 of an acre. RT Vol. 217 at 46. These units are called "pixels." *Id.* The process also requires some "groundtruthing." RT Vol. 217 at 48, 61-63. Sample fields are inspected to see whether the visual evidence of irrigated fields corresponds with the signature from the electronic data, and to make adjustments if necessary. *Id.* Aerial photos were also used to assist in classifying the land and determining field boundaries. RT Vol. 217 at 55, 69-70. Three maps showing the August satellite imagery over the whole length of the river are found in Colorado Exhibits 1271, A, B and C.

The automated classification system had difficulties with pasture lands that might have been irrigated early in the season but did not have enough water for the full season; with alfalfa fields recently cut; and with crops that had already been harvested. Kan. Exh. 1093 at 8; RT Vol. 233 at 85. Colorado sought to address these problems by obtaining additional satellite imagery for May, 1998. Mr. Bill Tyner, who was in charge of the study, also testified that he had "learned quite a bit" from this initial use of satellite imagery and from the year 2000-01 field work, and that he expected to make improvements in the future. RT Vol. 244 at 128. He said that he would be using three sets of images, perhaps even four, ranging over the spring, summer and fall. *Id.* at 129-30. He also expected to use higher resolution imagery, probably 5 or 15 meter units instead of 30 meters. *Id.* at 130.

C. Survey and Verification Program.

As part of the 1998 irrigated acreage study, Colorado also included a survey and verification program. Survey forms were sent to the owners and operators of all wells included in the Replacement Plans. RT Vol. 217 at 44-45. These included 725 farm units. *Id.* at 80-81, 83-87, 91. A sample survey form appears in Colorado Exhibit 1268 at 25. Colorado sought information on the wells, their locations, ownership of ditch shares, total irrigated acres, acres irrigated by surface water only, acres irrigated by wells only, and acres irrigated by both wells and surface water. RT Vol. 217 at 44-45. Farmers were advised that failure to return the completed survey would jeopardize their ability to be included in the 1999-2000 Replacement Plans. Ultimately, data were collected for all of the 725 farms with wells in Replacement Plans. Colo. Exh. 1268 at 27. Colorado then began to verify the survey information by sending local water commissioners into the field to interview the farm owners and operators. RT Vol. 217 at 81-92; Colo. Exh. 1268 at 5-7. The initial verification effort included a random selection of 10% of the total well population; 20% of farms with sole-source wells; and 10% of the farms with multiple wells. Colo. Exh. 1268 at 27. When the first irrigated acreage report was completed and provided to Kansas, the field verification work had been completed on 258 farm units. *Id.* That first report included the results of the GIS system, the satellite imagery, the survey information, and the verification work. Colo. Exh. 1268.

D. Kansas' Independent Investigation.

The initial results of the Colorado study were provided to Kansas. Mr. Book compared the results of the Tyner

mapping and satellite imaging process with the input previously used in the H-I model. That prior mapping was based on 1980 aerial photos with some updates and 1989 field work, all of which had been done by Kansas. RT Vol. 233 at 67-69. This earlier mapping was then converted into GIS coverage so that it could be compared with the Colorado results. *Id.* at 68. Kansas experts noticed that some of the fields that had been mapped on the basis of 1980 photography had not been included in the 1985 Moravec mapping, and hence were not in the 1998 Colorado study. About 20,000 acres were involved. RT Vol. 233 at 68-69. Secondly, Kansas found that about 8000 acres, classified as not being irrigated, had been found to be irrigated in the earlier 1980 aerial photos and 1989 field work. *Id.* Kansas' experts then undertook their own three-week field investigation in the summer of 2000, using a GPS system to locate the fields in question. RT Vol. 233 at 68-69, 86-87; Kan. Exh. 1093 at 6-8; Colo. Exh. 1408 at 9. As a result of its field work, Kansas concluded that 528 fields, totaling 10,099 acres, should be added to the Colorado GIS field polygons of 7125. Colo. Exh. 1408 at 11, Table 3. Colorado accepted most of these field additions, and after further field work of its own, increased the number of GIS polygons to 7578. Colo. Exh. 1408, Table 3. A significant number of the new fields were small and irrigated only by surface water when those supplies were abundant. Colo. Exh. 1408 at 14-15. Colorado acknowledged that there are "inherent inaccuracies" in the automated classification process using satellite imagery, and that in 1998 there were also limitations on the groundtruthing undertaken by Colorado. Nonetheless, Colorado stated that the land classifications based on satellite imagery had proved very useful, and that the process worked well for most crops and for larger fields. *Id.* at 15. Colorado expects

that the field investigations will provide refinements for future use of the satellite imagery process. *Id.*

Kansas experts also identified 362 fields, totaling 11,395 acres, that were in fact irrigated but had been classified by Colorado as nonirrigated. In addition, Kansas concluded that 186 fields, totaling 5123 acres, were not irrigated, but had been classified as irrigated by Colorado. Colo. Exh. 1408 at 13. Colorado's subsequent staff investigation produced agreement with the Kansas recommendations for about 81% of the fields. *Id.*

Following the results of its initial study, Colorado continued its field investigations and included a second satellite imagery done in May. By the time of this trial segment, Colorado had verified an additional 168 farms, bringing it to a total of 426 verifications out of 725 farm units. Colo. Exh. 1269 at 7. The results of this additional work are found in Colorado Exhibit 1269. The farms verified represent 67,000 acres of 84,500 acres that received well water in 1998. Colo. Exh. 1269 at 7. Colorado represents that it intends to complete its verification process by March 2003, and then would begin a five-year cycle where the state would re-verify 20% of the farm units each year. RT Vol. 258 at 5-7; RT Vol. 269 at 15, 61, 66.

E. Revised Results of Colorado's 1998 Irrigated Acreage Study.

Irrigated acreage in Colorado has been continually declining. The average acreage figure used in the H-I model for the 1950-85 period was 313,867 acres; for 1986-94 the model figure had declined to 288,774 acres; and for 1995-96 it was 267,985. Second Report at 12; Kan. Exhs. 759, 786; RT Vol. 150 at 12; Kan. Exh. 1093, Table 1. For

the years 1997 through 1999, Colorado's 1998 study showed total irrigated acreage to be just over 259,000 acres. Colo. Exh. 1442. These were data based upon the field verifications completed at the time of trial, namely, 426 out of 725 farm units. Colo. Exh. 1269 at 7. The comparable Kansas data for 1998 were just over 261,000 acres. Kan. Exh. 1093, Table 1.

Colorado's irrigated acreage study also calculated the amount of land irrigated by surface water only, the number of acres irrigated by groundwater only, and the number of acres receiving both surface water and groundwater. This latter category is referred to as "supplemental acreage" or "mixed" acreage, and the wells pumping the water for these lands are referred to as "supplemental wells." The Colorado figures are shown in Colorado Exhibit 1442; RT Vol. 244 at 80-83; RT Vol. 269 at 12. Surface water only lands ranged from 162,000 to 166,000 acres over the 1997-99 period. The comparable Kansas figure is 186,773 acres. Kan. Exh. 1093, Table 3. For lands irrigated with groundwater only, the Colorado results average about 15,000 acres, while the Kansas average is about 18,000 acres. Colo. Exh. 1442, Table 5; Kan. Exh. 1093, Table 3.

However, the most significant reduction from the data used in past versions of the H-I model, and the most important difference between the states, concern the supplemental or mixed acreage figures. Colorado shows a range from 72,814 to 78,773 acres for 1997-99. The Kansas figures are between 91,566 and 92,083. *Id.* Supplemental acreage is a key to Stateline depletions. As the amount of supplemental acreage is increased in the model, so are depletions. RT Vol. 233 at 140-142. The supplemental acreage used in the 1995-96 version of the H-I model was 147,293 acres, and both states recognize that this figure

was too high. Colo. Exh. 1268 at 21. But the states are some 15,000 acres apart on what the reduction should be. The appropriate supplemental acreage figure will depend upon completion of the Colorado irrigated acreage study and its continued updating.

F. Well Data.

Currently there are approximately 2100 irrigation wells in Colorado's database for the model area. Colo. Exh. 1267 at 8-9, 15; Kan. Exh. 1093, Table 2. During the 1997-99 period, almost half of these wells were classified with the state as "inactive." Colo. Exh. 1267 at 15; Kan. Exh. 1093 at 10. This does not mean simply that the wells were not pumped, but rather that a filing had been made with the state whereby they may not be pumped. Colorado maintains an inspection program to prevent such unauthorized pumping. Kan. Exh. 1093 at 10; RT Vol. 242 at 36. All wells which are not classified in any year as being "inactive" must be included in a Replacement Plan. *Id*. Mr. Tyner testified that since the Use Rules had been adopted in 1996, typically just over half of the wells have been active. RT Vol. 218 at 77. He does not foresee a "large number" of inactive wells becoming active again in the future. RT Vol. 245 at 51. The LAWMA Replacement Plan, for example, requires that any farmer attempting to add a new well to the plan must bring his own source of replacement water. *Id*. In 1999 there were 1199 active irrigation wells included in Replacement Plans. Colo. Exh. 1267 at 10. During 1997-99, pumping by sole source wells ranged between 32,999 and 42,581 acre-feet. Kan. Exh. 1093, Table 6. Supplemental well pumping varied between 54,106 and 76,853 acre-feet. *Id*.

In the past, and in the absence of reliable data, "simplifying engineering assumptions" have been used to allocate surface and groundwater supplies in the H-I model. RT Vol. 218 at 77-78. Surface water supplies are distributed uniformly to all lands within a ditch system that have access to such supplies. RT Vol. 233 at 122, 124-25; RT Vol. 245 at 8. This uniform distribution includes lands that may also receive well water. RT Vol. 233 at 132. With respect to groundwater, the basic procedure used by Kansas has been to assume, with some adjustments, that if a well were located within a section, the entire section would be considered as being irrigated by the well. RT Vol. 233 at 122-24; Colo. Exh. 1268 at 9. Colorado, on the other hand, based its earlier model estimates of land irrigated by both surface and groundwater on the Water Court's decreed and permitted acreage. Colo. Exh. 1268 at 9. And it was not until the 1995-96 version of the H-I model that data for sole source wells were separately broken out. RT Vol. 233 at 120. Prior modeling assumptions of the amounts of acreage irrigated by supplemental groundwater were substantially greater than the amounts shown by the Colorado irrigated acreage study. (See Kansas letter of December 6, 2002: the amounts were 156,000 acres for 1991-94; 147,000 for 1995-96; compared to 91,000 for 1997-99.)

Under the GIS system, Colorado has been mapping the groundwater acreage and determining the exact number of acres associated with each well. RT Vol. 245 at 52. The Colorado program will determine which wells are sole source, and which wells are supplemental. *Id*. at 54. At the time Mr. Tyner testified, he still lacked verification for 140 of the original 725 farm units, but he expected to finish in the 2002-2003 winter. *Id*. at 55. Later evidence

indicates that the work will be complete in March, 2003. Kansas acknowledges that such mapping and documentation is needed, and "would provide the basis to identify the acreage on farm units using ground water each year." Kan. Exh. 1093 at 10.

G. Supplemental Acreage.

Irrigation water is distributed in the H-I model on an acreage basis, depending upon how the land is classified, namely, as (1) surface water only; (2) groundwater only ("sole source" land); or (3) supplemental land which receives both surface and groundwater. RT Vol. 233 at 120, 132. Because the H-I model does not recognize individual farm boundaries, supplemental acreage is reflected in the model as a percentage of land within a ditch service area. Colo. Exh. 1353, Table 2; Kan. Exh. 1093, Table 4; RT Vol. 233 at 139. In assessing potential depletions for 1997-99, Colorado used the results of its 1998 irrigated acreage study as direct input to the H-I model. RT Vol. 233 at 133. Kansas, however, "reclassified" the supplemental acreage to obtain what was said to be a more "reasonable distribution of water supply within farm units." Kan. Exh. 1093 at 11. The effect of the reclassification was to increase the acreage receiving groundwater from 95,000 to 110,000 acres. Kan. Exh. 1093 at 11; RT Vol. 233 at 146. In turn, the impact of this change was to increase Stateline depletions as shown by the H-I model. RT Vol. 233 at 140; RT Vol. 237 at 140-42; RT Vol. 242 at 24-26.

Mr. Book's rationale for this reclassification was that the model has always distributed surface water uniformly over the whole canal system. RT Vol. 233 at 143; RT Vol. 242 at 23. Pumped water, he testified, is then distributed

"on top of that." RT Vol. 242 at 25; RT Vol. 233 at 132. In some situations, he said, the total supply could be greater than crop demand, producing "excess supply" which increases runoff and reduces Stateline depletions. RT Vol. 242 at 25; RT Vol. 233 at 137-38. To remedy this perceived problem, Mr. Book recommended that the surface water only lands be considered as supplemental acreage. RT Vol. 233 at 130-40, 142-44, 146-47. In essence, if a farm unit had a well, all of the land within the farm would be considered as supplemental acreage, and both surface and groundwater would be distributed uniformly over the whole farm by the model. RT Vol. 233 at 145; Kan. Exh. 1093 at 11. Mr. Book acknowledged, however, that farmers' testimony showed that they did not use their surface and well water supplies in this way. RT Vol. 242 at 23-24. It appears that Mr. Book's groundwater recommendation is an effort to compensate for problems with the model's "surface water allocation," and does not replicate actual conditions. RT Vol. 242 at 24.

The Kansas reclassification of groundwater applied only to the H-I model use for the 1997-99 period. RT Vol. 233 at 140. When Kansas recalibrated the model using the period 1950-94, it classified supplemental acreage quite differently. In the recalibration procedure, Kansas assigned groundwater on the basis of decreed and permitted acreage, including acreage associated with inactive wells. RT Vol. 233 at 131, 152; RT Vol. 242 at 30; Kan. Exh. 1093, Table 4. Mr. Book testified that it was best to include all of the inactive wells when looking back historically, although there was no evidence as to how many of the wells currently declared to be inactive had been pumped earlier. RT Vol. 233 at 152. Nor did Mr. Book adjust for the fact that substantially fewer wells existed in the 1950s and 1960s.

RT Vol. 242 at 29. Both states in the past have relied upon decreed and permitted acreage, but better data were not then available. Since the Use Rules were enacted, almost half of the wells have been inactive, and over a period of time including both wet and dry years. RT Vol. 218 at 77. In the wet years when surface supplies are abundant, there is less need for supplemental pumping. And in the dry years, when farmers historically have relied more heavily on well pumping, the availability of replacement supplies now acts to constrain such pumping. Yet Kansas has used its 1950-94 recalibrated model to predict compact compliance in the future. RT Vol. 233 at 127-29; Kan. Exh. 1093, Table 4. That is, future depletions are based not on actual supplemental acreage data, but rather on the decreed and permitted acreage associated with all irrigation wells in the model area, including inactive wells. Such model input is clearly contrary to the evidence.

H. Conclusions.

The H-I model is designed, insofar as feasible, to replicate actual conditions and on that basis to calculate depletions of usable Stateline flows. RT Vol. 239 at 109-11. Colorado's irrigated acreage study and program provide reliable data on how groundwater is actually applied, and should be used in place of prior modeling assumptions. The supplemental acreage data for 1997-99, as it may be modified upon completion of the verification program, should be used as model input for those years. As the H-I model is used in the future to measure Colorado's compliance with its compact obligations, input to the model for surface water only acreage, for sole source

acreage, for supplemental acreage and how groundwater is actually applied, shall be based upon the data developed from Colorado's several programs; provided that nothing herein shall prejudice the right of Kansas to object to or contest such data. Indeed, work by Kansas' experts in the past has brought about substantial improvements to these Colorado data, and continued input by Kansas should be encouraged.

SECTION VI

CROP CONSUMPTIVE USE IN THE H-I MODEL

An important function of the H-I model is to estimate the consumptive use of water applied to irrigate the various crops grown along the Arkansas River Valley. As part of this function, the model utilizes an estimate of the potential evapotranspiration (PET) which establishes an upper limit on crop consumptive use. RT Vol. 248 at 145-46, 149; RT Vol. 249 at 13. It should be kept in mind that the PET is not necessarily the same as actual evapotranspiration (ET). Actual consumptive use values calculated by the H-I model may be less than the PET under water short conditions. The PET factor comes into play under conditions of a full water supply. RT Vol. 266 at 19, 23. To the extent that the PET increases, the model may simulate greater crop consumption of water, with less water being returned to the river to contribute to the supply at the Stateline. Conversely, lower estimates of PET generally mean that more water is shown to reach Kansas. In all previous versions of the H-I model the estimates of PET have been based on the modified Blaney-Criddle equation developed a number of years ago by the U.S. Soil Conservation Service. Jt. Exh. 152. This is a widely used temperature-based method of estimating seasonal crop

water use, requiring only average monthly air temperatures and an estimate of the percentage of annual daylight hours. When the H-I model was developed, the Blaney-Criddle method was the best available. However, more accurate methods of calculating crop water use have now been developed, although they require more weather data than the modified Blaney-Criddle formula. These other methods are called "reference" type equations, and are based upon daily maximum and minimum temperatures, wind, solar radiation, and relative humidity.

In this last trial segment, Kansas proposed a change in the model input for PET, substituting a reference type equation known as the ASCE standardized Penman-Monteith equation for the Blaney-Criddle formula. This became a major trial issue. Neither state recommended the continued use of the Blaney-Criddle method. RT Vol. 247 at 84-85; RT Vol. 252 at 99-100; Kan. Exh. 1094. However, experts for Colorado advocated a different reference equation, namely, the 1982 Kimberly Penman method. RT Vol. 247 at 78, 90, 97; Colo. Exh. 1409 at 2. They also testified that certain adjustments would be required for wind, aridity, management and salinity in order not to overestimate evapotranspiration (ET). Crop "consumptive use" of water and ET are often used interchangeably. RT Vol. 235 at 147.

Credible studies show that the Blaney-Criddle method underestimates PET in arid locations by as much as 16 percent. Kan. Exh. 1109, Table 7.13 at 226; Kan. Exh. 1094 at 3; Colo. Exh. 1409 at 8. The ASCE Manual 70 states that the Blaney-Criddle method "typically underestimated reference ET in the arid climates." Kan. Exh. 1109 at 235, Table 7.18. Yet, the Colorado adjustments made to the proposed 1982 Kimberly Penman equation

would leave PET at about the same levels as under Blaney-Criddle. RT Vol. 266 at 131; Colo. Exh. 1409, Table 13. Underestimating PET has the effect in the model of reducing Stateline depletions. Conversely, the Penman-Monteith equation, recommended by Kansas, increases PET values by about 10 percent, and actual ET by 3 percent. RT Vol. 241 at 105-06. This change would cause model depletions to increase, although the states disagree over how much. Kan. Opening Br. at 10; Colo. Reply Br. at 12. Mr. Sullivan indicated for Kansas that the difference would be about 2031 acre-feet per year. RT Vol. 262 at 24. Colorado thought the change to Penman-Monteith would cause a greater increase in depletions, but I dc not find a specific figure from their experts. The issue should not be, however, which state might gain an advantage through any PET change but rather which model input is likely to produce more accurate results.

A. Penman-Monteith Method.

ASCE Manual 70 entitled "Evapotranspiration and Irrigation Water Requirements" compares the results of studies on numerous methods used to calculate crop ET.[7] Kan. Exh. 1109. The Penman-Monteith, 1982 Kimberly Penman, and Blaney-Criddle methods, among others, are compared with precision lysimeter data.[8] Kan. Exh. 1109,

[7] "ASCE" is the American Society of Civil Engineers. One of the three editors is R. G. Allen, a principal Kansas expert witness on this subject.

[8] A lysimeter is a container in which a crop is grown and the applied water is carefully measured. The amount of water actually consumed by the crop, i.e., the ET, is then calculated either by subtracting the amount of water that drains from the container, or through

(Continued on following page)

Table 7.13, at 226. Penman-Monteith results for arid locations were 1 percent under the lysimeter measurements; the1982 Kimberly Penman results were 3 percent over; and Blaney-Criddle results were 16 percent under. The National Engineering Handbook, published in 1993 by the U.S. Department of Agriculture and the Soil Conservation Service, recommends using the Penman-Monteith method, when appropriate data are available, because it is the "most accurate." Kan. Exh. 1107 at 2-41; Kan. Exh. 1182, App. A at 22; RT Vol. 267 at 9. In tests performed at Bushland, Texas, a research center about 200 miles from the Arkansas River Valley, the standardized Penman-Monteith equation again outperformed the 1982 Kimberly Penman method, as well as Blaney-Criddle. Kan. Exh. 1168. That study reported that the Penman-Monteith equation predicted alfalfa ET well, while the 1982 Kimberly Penman produced "biased estimates in all years, tending to over-predict ET at low ET rates and under-predict at high ET rates." Kan. Exh. 1168 at 270-71. The Bushland studies were specifically aimed at determining ET in a "windy, semi-arid environment." Kan. Exh. 1168 at 266. Bushland is known as a "very windy location," and "its aerial conditions are not very different from Arkansas Valley." RT Vol. 266 at 156. The Penman-Monteith method has now been adopted by the Food and Agriculture Organization of the United Nations as its "sole method for calculating reference crop evapotranspiration." RT Vol. 266 at 139. See FAO-56, "Guidelines for Computing Crop Water Requirements." Kan. Exh. 1183. Both the Penman-Monteith

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other water level or weight change techniques. RT Vol. 247 at 41-42. The lysimeter can also be sited in a field plot.

and the 1982 Kimberly Penman methods require the same data, namely, daily air temperature, and measurements of wind speed, solar radiation, and humidity. RT Vol. 247 at 89-91; RT Vol. 266 at 143. These data were not available along the Arkansas River in Colorado until 1993.

B. CoAgMet Climatic Data.

Climate stations operated by the Colorado Agricultural Meteorological Network, "CoAgMet," were established along the Arkansas River in the early 1990s at Vineland, Avondale and Rocky Ford. Kan. Exh. 1094 at 4. These stations represented a joint effort by Colorado State University and the USDA Agricultural Research Service Water Management Unit. Kan. Exh. 1178. The system is now under the control of Colorado State Climate Center. RT Vol. 251 at 116; RT Vol. 253 at 15. Electronic data necessary for use in either of the recommended reference equations are available from 1993. Kan. Exh. 1094 at 4. These three stations are all located upstream of John Martin Reservoir, although since 2001 two new stations have been operating downstream at Lamar and Holly. RT Vol. 266 at 134-35; Kan. Exh. 1182 at 3. The collection of data from 1993 from the three upstream sites has not been as good as might be expected. Some data are missing, other data are questionable. Dr. Ley testified that he was "disenchanted" with the maintenance of the electronic sensors at these sites. RT Vol. 251 at 87. Nonetheless, experts for both states worked independently with the records, making "integrity assessments" to develop "clean" data that turned out to be essentially the same. RT Vol. 247 at 113-14; RT Vol. 252 at 8-23, 32-36, 161; Kan. Exh. 1210 at 1, Figures 1-8. If data from all of these stations should become an important factor in the operation of the

H-I model, I am confident that we can expect more complete and accurate weather measurements in the future. RT Vol. 252 at 107.

C. Colorado's Reference Equation Adjustments.

Both the Penman-Monteith and the 1982 Kimberly Penman are reference type equations in which ET is established for a "reference" crop. In this case, the reference crop is alfalfa, and its ET was determined from studies done at Kimberly, Idaho, a research station of the U.S. Department of Agriculture. RT Vol. 247 at 24. To establish consumptive use for specific crops at different locations, local weather data are inserted into the reference equation to derive a local ET for the reference crop. This is essentially a climatic index. A coefficient for each individual crop is then applied against that index to calculate the PET of the actual crops being grown. Crop coefficients are different for each month in order to adjust the reference equation to fit the growth processes of the various crops. RT Vol. 248 at 67-69.

Mr. Eugene Franzoy is a Kansas expert who has testified on several previous occasions on crop water use.[9] He applied the Penman-Monteith equation, using the CoAgMet clean weather data, and specific crop coefficients for wheat, corn, sorghum, vegetables and other crops grown in the Arkansas River Valley. With these data, he developed the consumptive use values used by Kansas in the H-I model. Kan. Exh. 1094. Initially, Mr. Franzoy used

[9] His qualifications appear in Kansas Exhibit 785.

crop coefficients developed at Kimberly for use in the 1982 Kimberly Penman equation. RT Vol. 247 at 99-100; Kan. Exh. 1182 at 4. These were later converted by a routine process to be suitable for use in the Penman-Monteith equation along the Arkansas River. Kan. Exh. 1182 at 4-5; Kan. Exh. 1210; RT Vol. 248 at 76-77. Mr. Franzoy's results were close to those calculated by the Colorado experts, except for certain adjustments which they made. RT Vol. 248 at 73-74, 77-79, 82.

Colorado's experts followed the same general approach used by Kansas, although using the 1982 Kimberly Penman equation instead of Penman-Monteith. Their results, however, were substantially different, not so much because of their choice of the reference equation, but because of the adjustments made to that equation and to the CoAgMet weather data. Colorado's experts made adjustments for wind, aridity, management and salinity. Without these adjustments to the Kimberly Penman method, and presumably to the Penman-Monteith equation also, they testified that evapotranspiration would be overestimated.

D. Wind Limit.

The first of the Colorado experts to testify in this issue was Dr. Robert W. Hill, a full Professor in the Department of Biological and Irrigation Engineering at Utah State University.[10] He has been an irrigation specialist at the University since 1985, providing technical assistance and training to farmers on irrigation, and advising state and

[10] His resume is Colorado Exhibit 1422, which includes a lengthy list of relevant publications, and overseas consulting experience.

federal agencies in all areas of irrigation and water resource management. He has done numerous studies of crop water use and yields, including a study of the consumptive use of irrigated crops in Utah. RT Vol. 247 at 14-15, 125-30.

In reviewing the CoAgMet weather data, Dr. Hill applied a wind limit of 132 miles per day to the measurements which were used to calculate ET. RT Vol. 247 at 136, 138. This limit, also referred to as a "wind run" or "wind travel," is defined as the average wind speed in miles per hour multiplied by 24 hours. *Id.* at 72-73. Thus, an average wind speed of 5 miles per hour, over 24 hours, would result in a wind limit of 120 miles per day. *Id.* at 73. The effect of Dr. Hill's recommended limit was said to remove the impact of high winds on evapotranspiration. *Id.* at 132, 137. He testified that a limit was necessary in any Penman type equation "in high wind environments." RT Vol. 250 at 143. Yet the true impact of his limit was to exclude not only high wind effects but all wind effects over an average speed of 5.5 miles per hour. RT Vol. 248 at 90, 100-01. While Dr. Hill acknowledged that the 132 limit was a "judgment" call, it was necessary in his opinion to prevent either of the Penman type equations from overestimating ET. RT Vol. 250 at 136-37.

Dr. Hill in previous work had imposed a wind limit of 100 miles per day, but in that instance he was applying the 1972 version of the Kimberly Penman equation before it had been improved in 1982 to include a better wind function. RT Vol. 248 at 95-96, 98; RT Vol. 250 at 134-35. In this case, Dr. Hill said he "relaxed" the previously used limit of 100 to 132 because he was also adjusting for irrigation management and salinity, and he thought that

otherwise there might be "some overlap." RT Vol. 248 at 102-03.

Contrary testimony was offered by Kansas' expert, Dr. Richard Allen. In his opinion a wind limit in the Arkansas River Valley was not only not necessary, but was not appropriate. Dr. Allen is presently a Professor of Civil Engineering and Biological and Agricultural Engineering at the University of Idaho. He has published some 40 articles in refereed journals, and 79 non-refereed articles. He is a contributing author or co-editor of numerous ASCE manuals, and United Nations Food and Agriculture Organization (FAO) publications, on evapotranspiration. He is one of the three editors of ASCE Manual 70 on Evapotranspiration and Irrigation Water Requirements. Currently Dr. Allen is the Chair of the Technical Committee on Evapotranspiration which is working on revising Manual 70.[11]

Dr. Allen pointed out that both the 1982 Kimberly Penman and the Penman-Monteith equations include calibrated wind functions and therefore do not require a limit. Kan. Exh. 1182 at 6, App. B at 30. Dr. James Wright, who developed the 1982 Kimberly Penman equation, did not recommend imposing a wind limit, and did not use a wind limit in developing the crop coefficients, or in calibrating the crop coefficients to the lysimeter data used for the 1982 Kimberly Penman or Penman-Monteith equations. RT Vol. 267 at 6; RT Vol. 248 at 86-87; RT Vol. 270

[11] Dr. Allen's resume is Kansas Exhibit 1181, and his extensive qualifications appear at RT Vol. 266 at 106-28. His research, consulting and teaching experience include many projects around the world.

at 62-63. Dr. Hill could not cite any article that recommended applying a wind limit for the 1982 Kimberly Penman equation. RT Vol. 248 at 110. Neither the ASCE Manual 70, nor the United Nations Food and Agriculture Organization in FAO-56, recommends using a wind limit with either of the reference crop evapotranspiration equations. Kan. Exh. 1182 at 6, Kan. Exh. 1183; Kan. Exh. 1109; RT Vol. 248 at 85-86; RT Vol. 268 at 24-25.

The 1982 Kimberly Penman equation used by Colorado was developed at Kimberly, Idaho based on climatic data measured at that location. It does not appear that wind conditions at Kimberly are appreciably different from those along the Arkansas River in Colorado. Dr. Hill testified that the average wind travel at Avondale is 134 miles per day, at Vineland it is 124, and at Rocky Ford it is 120 miles per day. RT Vol. 247 at 74; RT Vol. 248 at 88. At Kimberly the average wind travel is 124 miles per day. RT Vol. 248 at 88-89. At all of these stations wind speeds range on average between 5.0 and 5.6 miles per hour.

Dr. Allen demonstrated that if the 132 mile-per-day wind limit recommended by Dr. Hill were applied to the same data used to develop the 1982 Kimberly Penman equation, that ET would be under-predicted by the equation. Kan. Exh. 1182, App. B at 29. Application of the wind limit caused the Penman Monteith equation to estimate 8.5 percent lower than without a wind limit, and caused the 1982 Kimberly Penman to underestimate by 10.6 percent. *Id.*

It appears from the weight of the evidence that no wind limit should be applied to the measurements made at the CoAgMet weather stations. Evapotranspiration data from these stations are distributed daily to Colorado

farmers for their use in actual irrigation, and such ET calculations, using the 1982 Kimberly Penman equation, do not include any wind limit Kan. Exh. 1178; RT Vol. 252 at 104, 117-18.

E. Aridity Adjustment.

Colorado's other expert with respect to the assessment of weather data and siting of the CoAgMet weather stations was Dr. Thomas W. Ley.[12] Dr. Ley is an irrigation engineer who is currently employed by the Colorado Division of Water Resources as lead hydrographer in the Division 2 office in Pueblo, Colorado. He has been with the Division of Water Resources since February 1999, although he was also born and raised in Pueblo, Colorado. RT Vol. 251 at 36. Dr. Ley was previously employed as an extension irrigation engineer at Washington State University from 1983 to 1997. In that position, he designed and implemented the Washington Public Agricultural Weather System, consisting of 69 electronic weather stations that provide irrigation scheduling information. *Id.* at 51. In this case, Dr. Ley assisted in the preparation of Colorado Exhibit 1409, "Crop Water Use Estimates for the Arkansas River Basin in Southeastern Colorado," but his primary responsibilities related to Appendices B and C of that report concerning weather data. *Id.* at 80.

Dr. Ley evaluated not only the data collected from the CoAgMet weather stations, but also assessed their siting environments for use in reference equations. He testified

[12] His resume and qualifications are found in Colorado Exhibit 1432.

that a weather station from which data are to be used for reference ET estimation should be collected in what he called a "reference environment." RT Vol. 251 at 100. The weather station itself, he said, should be located over an actively transpiring green crop, preferably short clipped grass, and be centrally located in a large irrigated area. *Id*. The station should be in a wide open area without influence from trees or buildings. *Id*. And the weather data should be collected in an environment which is "similar" to that in which the reference equation and crop coefficients were developed. *Id*. at 105.

After a series of site visits to the CoAgMet stations, Dr. Ley concluded that there were "some significant departures" from what he would recommend if the data were going to be used for reference ET calculations. RT Vol. 251 at 95-96. He found that two of the weather stations were situated over non-irrigated, unclipped weeds; that dirt farm roads bordered on at least one side of the stations; and that the weather stations were located in areas irrigated by various crops that were harvested and sometimes fallowed so that a full cover of vegetation was not always present. Colo. Exh. 1409, App. B. Because of the siting environments, he concluded that conditions measured at the CoAgMet stations would be drier than under reference conditions. He gave each station an "aridity rating." A rating of "0" percent represented a completely irrigated condition, while a value of "100" percent represented a completely arid situation. Colo. Exh. 1409, App. B at 2. For Vineland, the aridity rating was 35 percent; for Avondale it was 39 percent; and for Rocky Ford it was 19-20 percent. Colo. Exh. 1409, App. B at 5, 16, 27. Without an aridity adjustment, he testified that PET would be overestimated. RT Vol. 252 at 42. His adjustments

included subtracting a constant one degree Fahrenheit from the daily maximum and minimum air temperatures measured at Vineland, and subtracting one and one-half degrees at Avondale, together with certain dew-point changes. RT Vol. 252 at 43-45. His aridity adjustments were designed to achieve measurements that would have been made if the stations had been located under reference conditions, namely, the conditions at Kimberly, Idaho. RT Vol. 252 at 52.

The ultimate results of his aridity adjustments were to decrease PET values at Avondale by 5 percent, at Vineland by 3.7 percent, and at Rocky Ford by 0.75 percent, and thus to decrease depletions at the Stateline. Kan. Exh. 1179; RT Vol. 252 at 163-64.

At the heart of Dr. Ley's opinion was his belief that conditions at and surrounding the CoAgMet stations were not the same as the reference conditions at Kimberly, thus resulting in drier measurements. However, Kansas produced substantial evidence to the contrary. Dr. Allen, whose office is located at Kimberly, identified a series of photos of the Kimberly research station, including satellite photographs of the surrounding area. Although Dr. Allen is a Professor at the University of Idaho, his office is at the research and extension center in Kimberly. The photos show conditions at Kimberly not only at the present time, but also during the years when Dr. Wright developed his 1982 Kimberly Penman equation. The conditions appear to be very similar to those at the CoAgMet stations along the Arkansas River.

The weather station site at Kimberly is a small grassed plot surrounded by agricultural research fields. These research fields show many bare soil conditions due

to harvesting and crop rotation. Three sides of the weather station are bordered by dirt and asphalt roads. On the far side of one of the roads is the large research station, including about two acres of asphalt and buildings. Kan. Exhs. 1173, 1174, 1175, 1176, 1182, 1184; RT Vol. 267 at 49-62. Satellite images of a two-mile circle around the several weather stations show that the irrigated areas around Avondale, Vineland and Rocky Ford were at least equal to, if not greater than, the irrigated fields surrounding the Kimberly station. Kan. Exh. 1177. The Kimberly Station is located about five miles east of Twin Falls, Idaho, on the high plains area along the Snake River. The elevation is about 4000 feet, similar to that of the Arkansas River Valley. RT Vol. 267 at 70-71. Dr. Allen testified that the Kimberly weather station was located in an environment "similar" to that of the CoAgMet stations, and that no adjustments should be made to the CoAgMet data. Id. at 48, 70-72, 115-16. It is significant that Dr. Wright made no adjustments to the Kimberly weather data for aridity. RT Vol. 252 at 117-18; RT Vol. 253 at 58; Kan. Exh. 1109 at 161, Table 6.19.

Dr. Ley, however, was not moved by the departures at Kimberly from ideal reference conditions. RT Vol. 267 at 13. He testified that he understood that Dr. Wright in his work at Kimberly had excluded those times when reference conditions were not met. RT Vol. 252 at 134; RT Vol. 253 at 30, 45. There was no evidence to support this premise. RT Vol. 253 at 34. Indeed, an article by Dr. Wright describing his procedures made no mention of any such exclusions, and instead stated that "Daily reference ET was then computed for the entire period [1968-78] from daily weather data." Kan. Exh. 1172 at 58. Crop coefficients were

determined for every day of the growing season. RT Vol. 253 at 41.

In trying to distinguish Kimberly from the CoAgMet stations, Dr. Ley also placed singular reliance on the fact that the Kimberly sensors overlay clipped grass, as opposed to those at the CoAgMet stations. RT Vol. 253 at 53, 55. In ascribing overriding importance to this factor, to the near exclusion of the nearby and distant irrigated environment, he disregarded the weighting factors found in the literature, and those that he himself had used in calculating his aridity ratings. Colo. Exh. 1409, App. B at 2; RT Vol. 252 at 125-26; Kan. Exh. 1109. An analysis by Dr. Allen of the CoAgMet stations demonstrated that more than 90 percent of the impact in the weather sensors came from within a one-mile radius upwind. RT Vol. 267 at 69. Taking into account wind conditions in the Arkansas River Valley, and even assuming bare soil under the weather sensors, Dr. Allen concluded that the average impact on the sensors would be in the range of only 2-3 percent. *Id.* at 68.

Dr. Allen also compared the humidity data from the CoAgMet stations with the data from Kimberly. This evidence showed that the CoAgMet stations were actually more humid, i.e., less dry, than Kimberly. RT Vol. 267 at 38-39. Humidity data for the growing season (March-October) at Kimberly showed that the "daily maximum relative humidity" over the period 1985-98 was less than 80% during 27% of all days. Kan. Exh. 1182, App. C, Table C-1; RT Vol. 267 at 38-39. During 1969-71 when the 1982 Kimberly Penman equation was developed, daily maximum relative humidity was less than 80% during 33% of the days. Kan. Exh. 1182, App. C, Table C-1; RT Vol. 267 at 29. Comparing the CoAgMet stations, daily maximum

relative humidity at Vineland was less than 80% during 14% of the days; 14% at Avondale 17% of the days; and at Rocky Ford during 19% of the days. RT Vol. 267 at 38-39. Dr. Allen concluded, properly I find, that the CoAgMet measurements should not be adjusted to remove the impact of "dryness of air." RT Vol. 267 at 41. The CoAgMet values of crop ET are distributed daily for use in irrigation scheduling in Colorado, and these data are not adjusted for aridity. RT Vol. 252 at 104, 117-18; Kan. Exh. 1178.

While certainly Dr. Ley was conscientious in his efforts to fully assess the CoAgMet data, I find that the evidence on the whole does not support his recommended aridity adjustments.

F. Irrigation Management Adjustment.

Dr. Hill also reduced the ET values he calculated using the 1982 Kimberly Penman method by applying an irrigation management adjustment factor. Alfalfa ET was reduced by 6%; corn, sorghum and grains by 5%; and vegetables were reduced by 3%. Colo. Exh. 1409 at 33-34; Table 12 at 43. The downward adjustment was intended to reflect the difference between reference equation conditions, and the results that might be expected in farm fields. RT Vol. 250 at 17. Such differences included irrigation scheduling, uniformity of irrigation, and "perhaps" frost, hail, insects and disease. RT Vol. 249 at 134. These reductions were a "judgment" decision, although he relied heavily on a 1979-81 Utah study for alfalfa ET. RT Vol. 249 at 135, 138, 150; RT Vol. 250 at 82; Colo. Exh. 1409, App. A, Fig. 2.

The results of the Utah study are found in Dr. Hill's Report. Colo. Exh. 1409, App. A, Fig. 2.[12] Dr. Hill looked at three Utah fields in Figure 2 and found that their average ET was 8% less than the ET calculated by the 1982 Kimberly Penman equation with a 100-mile per day wind limit. RT Vol. 250 at 16-17. He concluded, therefore, that if the equation were overestimating in Utah by 8%, it would be "reasonable to expect that it might overestimate by 6 percent in the Arkansas River Valley." RT Vol. 250 at 81-82.

In analyzing these three Utah fields, however, there is some question about the accuracy of the ET field results. Consumptive use was determined not through lysimeter measurements, but rather using neutron meters to measure changes in soil moisture content. RT Vol. 250 at 58. The difference in soil moisture between two dates was calculated as the measure of ET. RT Vol. 267 at 82. Of course, it was necessary under this procedure to account for applied water, either from irrigation or rainfall. The three fields were irrigated by sprinklers, not by furrows as in Kimberly. RT Vol. 250 at 59. The sprinkler water was measured by rain gauges, and Dr. Allen testified, with literature support, that such measurements likely underestimated the irrigation, and thereby the ET. RT Vol. 267 at 83-85. Use of rain gauges to measure sprinkler irrigation is a generally recognized problem, causing underestimation of applied water from 6 to 8 percent. *Id.*

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[12] The same Figure 2 is also included in a Bureau of Reclamation study that compared the behavior of 10 selected equations in estimating alfalfa ET. Colo. Exh. 1423 at 3-20.

Dr. Hill also acknowledged that it was difficult in the Utah study to determine how much water might have been lost to deep percolation past the root zone, as opposed to the water actually consumed by the crop. RT Vol. 250 at 59, 69-70. The neutron probe measurements could have included deep percolation. *Id.* at 65. The probes measured an area about 18 inches in diameter, and those results were then projected over the rest of the field. *Id.* at 62-63. Dr. Hill did not know whether the three fields had received a full water supply, which is a requirement of the reference equation. RT Vol. 250 at 36-37. Finally, part of the reduction in field ET was due, as Dr. Hill acknowledged, to the "windrow effect." RT Vol. 249 at 138. This referred to a situation where farmers left cut hay on the ground for 8-10 days, thereby affecting the regrowth of the plants underneath. *Id.* There was no evidence that this practice was prevalent in the Arkansas River Valley.

Dr. Hill's only observation of farms in the Arkansas Valley came from a two-day driving trip with Dr. Ley. This visit included not only some Colorado farms, but also farms in Kansas as far downstream as Garden City, a distance of 150 miles in all. RT Vol. 247 at 80-81; RT Vol. 249 at 148-49. Dr. Hill testified that some farms were in "good" condition, while others were not, although he made no quantitative division. RT Vol. 269 at 164. In any event, on the basis of this brief and incomplete tour, he concluded that the Colorado fields were "obviously not in lysimeter condition," and by implication that a management adjustment was required. *Id.* His adjustment included all fields, including those in good condition, apparently on the premise that reference calculations always overestimate ET on the farms. But the Bureau of Reclamation report, that includes the Utah study on which Dr. Hill relied, also

includes a number of other studies where the Kimberly Penman equation underestimates the field calculated ET. Colo. Exh. 1423, Figures 3-2 through 3-10. In this case, Dr. Hill had no field measurements of ET in Colorado. Nor did he know whether the fields he saw had a full water supply. PET comes into play only at times of full water supply. RT Vol. 267 at 82. Dr. Hill did understand that PET in the H-I model is not necessarily the same as the ET in a field. RT Vol. 269 at 166. The H-I model includes a factor based upon calculated soil water content, and if the moisture content drops below a certain level, then the model makes the adjustment of actual ET below the PET. *Id.*

As support for his 6% reduction in PET, Dr. Hill also pointed to a study by Dr. Allen in the Imperial Irrigation District in California. In that study Dr. Allen compared ET calculated by a reference equation known as CIMIS Penman [different from the Kimberly Penman] with consumptive use calculated from a water balance analysis. RT Vol. 250 at 91-92. The study is reported in Colo. Exh. 1427, and provided a district-wide ET, including some 400,000 acres. RT Vol. 267 at 75. The Imperial Irrigation District presents a unique situation. Its whole supply comes by canal from the Colorado River, and is carefully measured. Once used for irrigation, all tailwater runoff and groundwater resulting from leaching are collected in a drainage system, measured, and discharged into the Salton Sea or the New and Alamo Rivers. RT Vol. 267 at 74. The difference between the incoming supply, and the discharges into the Salton Sea and the two rivers, represents the consumptive use of the various crops which turned out to be less than the PET calculated from the reference equation. Dr. Allen then utilized aerial photos, a visual grid system of greenness, density, and bare fields,

and following certain FAO-56 prescribed procedures, adjusted the reference equation to reduce ET by 6%, that is, close to the water balance results. RT Vol. 267 at 81. It is common knowledge that the Imperial Irrigation District is below sea level, and Dr. Allen testified to extreme summer heat there, between 105 and 110 degrees, and "cracking" clay soils, that provide a poor basis to justify an equivalent adjustment in the Arkansas River Valley. RT Vol. 267 at 79.

Dr. Hill has developed a commercial model for crop growth and irrigation scheduling which is applicable to commercial fields as well as experimental plots. Kan. Exh. 1163. The model has been used for a wide range of crops, including alfalfa, grown in the Arkansas Valley, in Idaho, Utah, and in many countries around the world. *Id.* at 3. The model uses the Kimberly Penman equation among others, without any adjustment for irrigation management. RT Vol. 250 at 112-13.

At the heart of Dr. Hill's adjustments is his opinion that the 1982 Kimberly Penman equation overestimates ET. On the last day of trial he presented a table showing that alfalfa ET was overestimated by 11%. Colo. Exh. 1474. This result was based on Dr. Wright's data from Lysimeter 2 for the years 1972-75. RT Vol. 270 at 30. It is clear, however, that Dr. Wright did not use these data in developing the 1982 Kimberly Penman equation and the crop coefficients associated therewith. RT Vol. 270 at 32-33. Dr. Wright used only data from Lysimeter 1 during the years 1969-71. RT Vol. 270 at 26, 30-34. The data from Lysimeter 2 were rejected by Dr. Wright for a number of reasons: half of the top soil had been removed during leveling operations; more of the highly calcareous subsoil had been mixed into the surface layer; concerns about the

strain of alfalfa; periods when not enough water was supplied; and the fact that the irrigated cover was 6.9% less than Lysimeter 1. RT Vol. 270 at 27, 31, 34, 41-42. The data upon which Dr. Wright did rely do not support Dr. Hill's opinion. In fact, the 1969-71 data from Lysimeter 1 used by Dr. Wright show that alfalfa ET was slightly underestimated. Colo. Exh. 1474.

Dr. Allen testified that the management adjustment by Dr. Hill was poorly supported and cannot be checked against any known information. I am in agreement. While the experts speak in terms of "equations," the mathematical certainty that one might be led to expect from this terminology is not real. Clearly, under some conditions, adjustments are made to reflect local conditions, and these adjustments are not without subjective input. RT Vol. 267 at 16, 18, 24-27. However, in this case, a good deal more needs to be known about farm conditions in Colorado before an irrigation management adjustment should be considered.

G. Salinity Adjustment.

Lastly, Dr. Hill adjusted the PET for the effects of salinity in the Arkansas River water. There is no question about the fact that the Arkansas River, especially downstream of John Martin Reservoir, contains a high degree of salts. It is also an accepted principle that salinity can reduce crop yield through reduced consumptive use of water by the crop.

Dr. Hill's analysis was based first upon salinity measurements made by Mr. Miles, and published in a 1977 report. Colo. Exh. 89, Table 1. The Miles Report included a "volume weighted" salinity figure for each of

the canals, and also a figure for maximum salinity (TDS). Colo. Exh. 1409, Table 3; RT Vol. 249 at 27-29. The Miles data appear to have been collected over the period 1963-73. RT Vol. 249 at 87. More recent studies have been done, but Dr. Hill used only the Miles data in his calculations. *Id.* at 88-89. From these Miles data, Dr. Hill calculated what he termed a "time weighted" salinity value for each canal. RT Vol. 249 at 29. Using output from the H-I model, his salinity values were then adjusted by effective precipitation and a leaching fraction, that is, the percentage of applied water that passed through the root zone. RT Vol. 247 at 166-67; RT Vol. 249 at 25-26, 76. This process yielded the amount of salinity in the soil. It is the total amount of dissolved (unprecipitated) salts in the soil that affects crop yield. RT Vol. 249 at 65-66. Dr. Hill then relied upon published studies to calculate reductions in crop yield, based upon the soil salinity. RT Vol. 248 at 9-10; Colo. Exh. 1409 at 19, Table 11 at 42. And finally, he used other published studies to move from a reduction in crop yield to a reduction in ET. Colo. Exh. 1409, Fig. A1. There are no standard publications showing a direct relationship between salinity and ET. RT Vol. 267 at 102. He concluded that PET should be adjusted based upon salinity effects, particularly below John Martin Reservoir. RT Vol. 248 at 145.

There are problems, however, with the foundation of Dr. Hill's analysis, that is, with the salinity values he used for Arkansas River water. He did not use the volume weighted averages developed by Mr. Miles. Instead, he increased those values by using two-thirds of Miles' maximum values and only one-third of his volume weighted values, in order to develop a "time weighted" value. RT Vol. 249 at 29, 35, 69. For example, for the

Bessemer Canal, Miles' data showed a volume weighted average TDS, in parts per million, of 300, and a maximum value of 770. Colo. Exh. 1409, Table 3 at 22. Dr. Hill's time weighted average for the Bessemer was calculated to be 615. *Id.* This approach approximately doubled Miles' volume weighted averages for all canals. RT Vol. 267 at 98. The effect of Dr. Hill's modifications was to assume that all of the canals were diverting river water at maximum salinity two-thirds of the time. RT Vol. 249 at 29-31.

Dr. Hill's approach was not in accord with procedures outlined in the National Engineering Handbook, which call for using a volume weighted average in determining soil salinity, and was strongly criticized by Kansas' expert. Colo. Exh. 1401 at 2-115, 2-116; RT Vol. 267 at 92-94, 116. Salinity impacts on crop yield derive from the total amount of dissolved salt in the soil, which is related not only to the concentration in the applied water, but to the amount of irrigation water. Maximum irrigation water salinity is a measurement at a point in time, and does not relate to the total amount of salts applied to a field. Moreover, maximum salinity is likely to occur during low flow conditions in the river when the amount of water and salt delivered to a field is small. RT Vol. 267 at 94. Dr. Hill acknowledged that salinity problems are generally going to occur at low flow conditions, and that high water supply generally means lower salinity. RT Vol. 249 at 16, 18-19.

Dr. Hill modified the Miles flow weighted data because of certain statements found in the text of the Miles Report. The report states, "the volume weighted average TDS level does not accurately reflect the salinity problems," and later, "Unfortunately, many of the canals are diverting much more saline water most of the time. This water often approaches the maximum level shown in Table

1." RT Vol. 249 at 29. On the basis of these statements, Dr. Hill used his judgment to calculate his "time weighted" average based upon two-thirds of the maximum figures reported. Actually, there is no time averaging in his formula, and the reported maximums apparently could have occurred at any time during a decade. A recent study involving six canals upstream of John Martin showed wide seasonal variation in TDS, ranging from 548 ppm to 1190 ppm. Colo. Exh. 1431 at 91; RT Vol. 247 at 176. It should also be noted that Mr. Miles' comments related to "many of the canals," but Dr. Hill's PET adjustment applies to all canals. Miles also stated that canals holding junior rights may be able to divert only in times of higher flows when water quality is better. RT Vol. 249 at 32-33. Generally, the higher the river flows are, the better the quality will be. RT Vol. 248 at 148-49; RT Vol. 249 at 16. Typically, salinity is a concern at times of low flow. RT Vol. 248 at 149; RT Vol. 249 at 18-19.

There is another problem associated with Dr. Hill's analysis. All of the experts recognized that Arkansas River water carries large amounts of calcium and sulfate in solution, and that these ions will precipitate in the soil to form calcium sulfate, better known as gypsum. RT Vol. 267 at 114; RT Vol. 249 at 117, 121, 123-25. The presence of gypsum moderates, and perhaps even eliminates, the effects of salinity. RT Vol. 267 at 115-16. The threshold tolerances of crops for salinity increase where gypsum is in the soil. It can cause a "sizeable adjustment," perhaps as much as 1600 ppm of TDS. RT Vol. 249 at 111-14; Colo. Exh. 1429. Dr. Hill acknowledged the presence of gypsum, but did not take that into account in his calculations. RT Vol. 249 at 114, 117, 124-25. The Miles Report, however, on which Dr. Hill relies, states that "large amounts of less

soluble salts [are] precipitated east of La Junta [upstream of John Martin Reservoir]," and that "nearly all of the salt entering the system . . . is precipitated . . . between La Junta and the Stateline." RT Vol. 249 at 85, 104-05. If salts are precipitated out, the Miles Report states that they have no further relevance in regard to salinity problems. RT Vol. 249 at 84, 105.

Salts in the soil can also be controlled, or removed, by leaching, that is, by applying sufficient water to take the salts below the plant root zone. RT Vol. 249 at 71-72. The Miles Report states that even in dry years the senior ditches have water for leaching that "more than compensates for the higher salinity of the water." RT Vol. 249 at 32. Dr. Hill, using the H-I model, applied the same leaching fraction to all crops. RT Vol. 267 at 98. Kansas' expert, however, testified that farmers would operate differently. They would apply less water to salt-tolerant crops in order to preserve more water for leaching on the salt-sensitive crops like vegetables. *Id.* Earlier farmer testimony showed that some farmers used their well water in dry years for vegetable crops. Dr. Hill did not appear to take the quality of well water into account in his analysis. Dr. Hill's analysis showed essentially no reduction in crop yields due to salinity upstream of John Martin Reservoir. Colo. Exh. 1409, Table 11. Downstream, however, he showed yield losses up to 14% for alfalfa, 27% for corn grain, and for vegetables as high as 55%. *Id.* Kansas experts provided solid data to the contrary, showing no differences in crop yields for all of the major crops grown in the Arkansas River Valley between those farms located upstream of John Martin Reservoir and those situated downstream that irrigated with more saline water. Kan. Exh. 1210; RT Vol. 266 at 29, 32-33.

Finally, it does not appear that an adjustment to PET in the H-I model is the proper way to account for any salinity impacts that should be recognized. The PET in the model establishes an upper limit on crop consumptive use. RT Vol. 248 at 149. It comes into play only under conditions of a full water supply, while, as Dr. Hill recognized, salinity problems are typically associated with low flow conditions. RT Vol. 248 at 145-46; RT Vol. 249 at 18-19; RT Vol. 248 at 149. In times of low water supply, the amount of water available for consumptive use in the H-I model is controlled not by PET but by a factor known as the maximum farm efficiency. RT Vol. 266 at 23. This factor is supposed to allow enough water for leaching and tailwater runoff, as well as for ET. RT Vol. 235 at 145, 149-50. If the model does not simulate enough water for the proper leaching of salts, Kansas' expert testified that the maximum farm efficiency percentage should be reduced accordingly. Kan. Exh. 1210 at 6; RT Vol. 235 at 145-50.

Based on all of the evidence, I find that the PET should not be adjusted for salinity effects as recommended by Dr. Hill.

H. Conclusions.

The PET values for the various canals computed by both the Kansas and Colorado experts are similar, except for the adjustments made by Colorado. RT Vol. 247 at 100, 101; RT Vol. 248 at 78-79, 82. I conclude that the Colorado adjustments are not sufficiently supported, and the PET values to be used are those found in Kansas Exhibit 1164, last column. Colorado's final recommended values are found in Colorado Exhibit 1409, Table 13. For the canals below John Martin Reservoir, these Colorado values

represent a PET that is approximately 4.5% less than what has been used previously in the H-I model, as determined using the Blaney-Criddle formula, yet there was uncontroverted evidence that the Blaney-Criddle formula already tends to underestimate ET. This is not to say that the Kansas values, as calculated with the Penman-Monteith equation and crop coefficients, can never be changed. As more information is developed on conditions in the Arkansas River Valley, adjustments made in accordance with recognized professional procedures may be appropriate.

During this trial segment, climatic data from electronic weather stations suitable to calculate reference PET using the Penman-Monteith equation were effectively available at only two upstream stations, i.e., Rocky Ford and Avondale-Vineland combined. The ratios between these upstream Penman-Monteith values and the Blaney Criddle values were then used by the Kansas experts, with certain adjustments, to calculate values downstream. However, we now have in operation two new electronic weather stations at Lamar and Holly, and data from those stations should be used to develop appropriate adjustment ratios in those locations. Kansas experts adjusted the Blaney-Criddle PET values not only for the 1993-99 period but also for 1950-92 so that the PET values used in the calibration process would be consistent with the PET values used in the current and future compliance runs of the H-I model. Colorado appears to agree that the model should be recalibrated after inputting revised PET estimates. Colo. Exh. 1408 at 25. This is the procedure that should be followed.

SECTION VII

COLORADO'S CHANGES TO THE H-I MODEL

Dewayne Schroeder, Colorado's modeling expert throughout this long trial,[14] made a number of changes to the version of the H-I model that was approved for purposes of calculating 1995-96 depletions. Some of these changes, for example the amount of supplemental acreage and the credits recognized for dry-up, are discussed elsewhere in this Report. This Section deals with his remaining changes.

A. Interception by the Amity Canal of Fort Lyon Return Flows.

The Amity Canal diverts many miles upstream of its principal service area, and the canal runs along the north side of the Arkansas River immediately down-gradient of the very large area irrigated by the Fort Lyon Canal Company. Amity's own principal service area is located downstream to the east of Fort Lyon, and also on the north side of the river. There are three major drains which discharge tailwater from Fort Lyon irrigation into the Amity Canal, such water becoming part of its supply. RT Vol. 157 at 173-74; RT Vol. 158 at 28-29. The Amity Canal has records of these drain flows, except for four years. For

[14] Counsel for Colorado noted that this trial segment would be Mr. Schroeder's last appearance after dedicating 15 years of his life to this case, through some periods of great personal adversity. Certainly no expert has tried harder to improve the operation of the H-I model. His work has not always been successful, even by his own admission. And I have not always been in agreement. But his efforts have always been forthright, genuine and aimed at being constructive.

the period 1974-99, the recorded flows averaged 7493 acre-feet annually. Kan. Exh. 1093, Table 11; RT Vol. 260 at 66. For reasons that were not explained, the H-I model does not include this water as part of Amity's supply. Mr. Schroeder proposed to remedy this, and Kansas agrees that some modification to the H-I model is appropriate, but disagrees with the amount of intercepted flows proposed by Mr. Schroeder.

Initially, Mr. Schroeder thought that the amount of the intercepted return flows were around 49,000 acre-feet annually, but after reviewing a Kansas report, he reduced that figure. RT Vol. 226 at 87; RT 260 at 41. His revised model first shows average return flows intercepted by the Amity Canal of 41,184 acre-feet for the 1950-94 period. Kan. Exh. 1147. Later still, he made a dramatic reduction to 11,791 acre-feet, although the average period was different, namely, 1970-94. Colo. Exh. 1411, Fig. 2; RT Vol. 260 at 50. This revised amount was based on his conclusion that return flows from 40% of the Fort Lyon area were not tributary to the three drains, and therefore were not measured. RT Vol. 260 at 42, 57. Based on that assumption, Schroeder increased the measured drain flows by 67%. RT Vol. 260 at 53-57, 59. He testified that the Amity Canal receives flows from a number of small drains that are not measured, as well as from groundwater. RT Vol. 260 at 62, 69-72, 75. Mr. Straw made a field investigation of the area, and found more than 40 points at which Fort Lyon return flows enter the Amity Canal. RT Vol. 246 at 100. He was also of the firm opinion that the three measured drains did not capture the full extent of surface water flowing into the Amity Canal. *Id.* at 101. With respect to any groundwater contribution, however, there was evidence that groundwater levels at several points along the

Amity Canal were below the canal, and consequently groundwater could not seep directly into the canal.[15] RT Vol. 260 at 64, 68, 73, 74. Mr. Schroeder testified that he made another adjustment to account for groundwater flows that might go directly to the river, as well as for drain flows that Amity might release to the river during periods of high rainfall. RT Vol. 260 at 62, 66, 70, 72. During his model calibration process, he finally reduced the total amount of intercept flows by 25 percent. RT Vol. 260 at 60-62.

Mr. Schroeder's efforts were, in part, an attempt to remedy the fact that the H-I model historically over-predicts expected river flows at the Lamar gage. RT Vol. 246 at 90. A possible explanation may be that Fort Lyon return flows are actually consumed by the Amity Canal crops rather than flowing to the river. RT Vol. 246 at 90. While this explanation may have some merit, it is clear that far too much uncertainty surrounds the various amounts of intercepted return flows presented by Mr. Schroeder for any of his figures to be ordered as a model change.

In its revised version of the H-I model, Kansas simulated the Fort Lyon return flows intercepted by the Amity Canal at an average of 8517 acre-feet annually for the period 1974-99. RT Vol. 236 at 40; Kan. Exh. 1093, Table 11. This average results from model predictions, determined as a percentage of return flows "that are intercepted in such a way that [they] matched the historical

[15] Nonetheless, the Kansas revised H-I model did simulate some underground return flows. RT Vol. 236 at 47.

amounts [7493 acre-feet]." RT Vol. 236 at 40-42, 47. The Kansas average covers the irrigation season only. Flows during the non-irrigation season are simulated to return to the river. *Id.* at 48-49. The Kansas change was said to "reasonably replicate[s] what the historical records show." *Id.* at 50. However, such records may not reflect the full amount of intercepted flows. *Id.* at 50. Counsel for Colorado stated that whether the amount "is as high as Mr. Schroeder estimated is anoth r question," but clearly he said that Kansas acknowledges that the flows are higher than shown by the Amity Canal records, and the proper amount "can be refined through further investigation." Colo. Reply Br. at 34. Kansas agrees that measurements and monitoring need to be improved so that the model simulation of intercepted return flows is consistent with what is "actually occurring in the real world." RT Vol. 236 at 50. It is to be hoped that this will be done.

However, based on the limited evidence now before the Court, I find that the H-I model should be changed in accord with the recommendations of the Kansas experts. Perhaps future studies and measurements will dictate a different result, but at present the Kansas evidence is the most reliable.

B. X-Y Graham Alternate Points of Diversion.

The X-Y Canal water rights and the Graham Ditch rights are separate. At some point in time, at least by 1949, the diversion point of the Graham right was moved to the X-Y Canal, and the Graham water rights were diverted through a common canal. The Graham water was carried in the X-Y Canal for about two miles before being discharged into the old Graham Ditch. Colo. Exh.. 1411 at

13; Colo. Exh. 1416 at 2-3. Both of these water rights are relatively junior, but the X-Y right is senior to the Graham right. Colo. Exh. 1411 at 14. The X-Y right is for 69 cfs; the Graham right for 61 cfs. Colo. Exh. 1416 at 2. The capacity of the X-Y canal (66 cfs) was not sufficient to deliver the full amount of both these rights. Colo. Exh. 1411, Table 3. About 1961 most of two water rights and associated lands were combined under single ownership, and these rights are treated in the H-I model as a single water user. Colo. Exh. 1416 at 1, 3. In 1977 the Colorado Water Court approved existing wells as alternate points of diversion for 59.43 cfs of 6_ cfs of the Graham Ditch water right. Colo. Exh. 1353 at 9; Colo. Exh. 1416 at 3. These wells would be allowed to pump, without providing replacement water, the amounts of water that could have been diverted under the Graham diversion right, taking into account its priority and the stream flow available. As Colorado succinctly puts it, the issue is "how much of the pumping by the Graham wells should be considered as in-priority pumping under the Graham Ditch water right." Colo. Reply Br. at 38.

Mr. Schroeder implemented an extremely complex change to the H-I model regarding the Graham water right. He stated that the change was made "to account for the fact that the water right decreed to the Graham Ditch had been changed to wells in 1977." Colo. Exh. 1411 at 12-13. It is not apparent why a model change is necessary to account for a decree that merely establishes wells as an alternate point of diversion. However, Mr. Schroeder states that "when well pumping is limited to the pre-Compact pumping allowance in the Compact run, the model does not represent the increased demand to divert surface water . . . that would occur if the wells were not operated."

Colo. Exh. 1353 at 9. If that is true, it seems that the solution would be simpler than what Mr. Schroeder did.

Mr. Schroeder modified the model code by which the diversion demand for the X-Y Graham Canal had been previously determined. He subtracted from that previous demand an estimate of Graham pumping, apparently 40% of the pumping estimate for 1986 to 1995. RT Vol. 236 at 52-53; Colo. Exh. 1411 at 16. The change was only implemented in the model beginning in 1977. Colo. Exh. 1411 at 15-16. Those changes cause the model to demand more surface water in the compact run than it does in the historical run of the model. RT Vol. 236 at 53-54. The final result is to increase consumptive use for the X-Y Canal users in the compact run, in effect increasing its precompact entitlement. *Id.* at 54. For the model calibration period of 1950-94, observed diversions for the X-Y Graham Canal average 7718 acre-feet annually. The revised Kansas version of the H-I model predicts an average of 8390 in the compact run, while the Colorado Test Model predicts an average of 12,440 acre-feet. Kan. Exh. 1117. While the records are spotty and incomplete, a report prepared for LAWMA (which has acquired essentially all of the X-Y right and the X-Y Graham Article II account) shows average diversions for the Graham Ditch of 1383.9 acre-feet for 1895-1932 and 1946-63. Colo. Exh. 1416, Table 2. The LAWMA report also shows that the Graham wells have been pumping between 7000 and 10,000 acre-feet in recent years. *Id.* Table 9.

The Schroeder changes to the model code appear to increase historic use, and should not be made. However, I also do not agree with the conclusion of the Kansas expert, if I understand it correctly. Mr. Sullivan indicated that there was nothing different about the "XY-Graham wells"

from all other postcompact pumping. RT Vol. 236 at 65. At least as to the *Graham* wells there are court decrees establishing the wells as alternate points of diversion. It may well be true that the seniority of the X-Y right, the capacity constraints of the X-Y Canal, and the very junior priority of the Graham Ditch water right, all converge to dictate that the Graham lands received little surface water. However, to the extent that the Graham surface rights would be in priority, the X-Y Canal would have had capacity for Graham water, and there would be no enlarged use of the combined X-Y Graham water rights, the model should recognize the amount of pumped water that would have been diverted. Colorado states that there may be a "simpler method" to account for in-priority pumping by the Graham wells than was attempted by Mr. Schroeder. Colo. Response, October 8, 2003.

Kansas argues that this issue is *res judicata*, that no more than 15,000 acre-feet of precompact pumping can be allowed. Kan. Opening Br. at 42. However, I do not believe that prior decisions in this case were meant to preclude pumping to the extent that authorized surface diversions are replaced.

C. Buffalo Canal Seepage.

In July and September of 2001, Mr. Straw made two field trips along the Buffalo Canal to see if return flows were being intercepted from Amity lands. Colo. Exhs. 1419, 1420. On the first inspection he estimated flows from Buffalo Creek, Deadman Draw, Horse Draw and Simpson Draw, totaling approximately 15 cfs. Colo. Exh. 1419. Flows during the second trip were measured, totaling about 28 cfs. The H-I model, as it has been used

through the determination of 1995-96 depletions, does not represent these intercept flows. RT Vol. 246 at 98; RT Vol. 260 at 103. These intercepted return flows compare with headgate diversions into the Buffalo Canal of 67 cfs. Colo. Exh. 1420. Responding to those intercept data, Mr. Schroeder reduced the seepage factor in the H-I model for the Buffalo Canal from 9% to 1%. RT Vol. 260 at 96; RT Vol. 264 at 118. His purpose was to simulate the interception of return flows from the Amity lands, and he figured that reducing the seepage rate was "akin to putting more water in the canal." RT Vol. 260 at 96.

While this information was known, the data were not included in Mr. Schroeder's rebuttal report [Colo. Exh. 1411] and did not surface until his rebuttal testimony. RT Vol. 260 at 95. This is unfortunate, because it appears that a model adjustment may be in order, but Kansas experts indicated that Mr. Schroeder's approach was not the best way to address the problem. By reducing the canal seepage rate, the additional water in the canal becomes a function of the headgate diversions, not necessarily equating to the Amity flows. The greater the Buffalo diversions, the greater the Amity intercepted flows simulated in the model. RT Vol. 260 at 99. Moreover, the 1% loss from seepage is not reasonable. RT Vol. 264 at 118.

Mr. Schroeder's proposed model change increases the Buffalo water supply by an average of approximately 1500 acre-feet annually, which in turn reduces Stateline depletions. RT Vol. 264 at 121-22; RT Vol. 260 at 104. Mr. Book suggested that it would be necessary, before any model change is made, to look at the whole Buffalo Canal operation – with quantitative measurements of intercepted Amity return flows, amounts of water actually delivered to farmers, and amounts of water turned back into the river

through wasteway gates. RT Vol. 264 at 119. I am in agreement, and find that no change in the Buffalo Canal seepage rate should be made on the basis of present information.

D. Ungaged Tributary Inflows.

This was another effort by Mr. Schroeder to improve the model data on ungaged tributary inflows. He made the daily ungaged flows for certain reaches proportional to the gaged flows for the Huerfano and Apishapa Rivers. RT Vol. 260 at 37. Kansas acknowledges that perhaps this approach "has some merit," but again it came late in the trial, not being included in Schroeder's rebuttal report or even in his direct testimony. I concur with Kansas that any model change should be explicitly presented to the other state and to the Special Master. This is a matter for the future, not to be approved here.

E. Rerouted Return Flows, and Fort Lyon Leakage Allowance.

Mr. Schroeder proposed rerouting a portion of Reach 7 return flows to Reach 8. This model change made such Reach 7 flows unavailable for diversion by the Fort Lyon Canal. Colo. Exh. 1353 at 8; Kan. Exh. 1093 at 35. Kansas was in agreement with this change, and it should be made. Kan. Opening Br. at 45.

Mr. Schroeder also recommended initially a 30 cfs bypass of streamflow at the Fort Lyon Canal headgate because of leakage around, through, and under the diversion structure. Colo. Exh. 1353 at 10. During rebuttal testimony, however, he stated that the change did not operate in the Colorado test model as intended, and he

withdrew the proposal. Kansas is in agreement that no such bypass should be considered "at this time." Kan. Opening Br. at 46.

F. Holbrook Returns, Rocky Ford Transfer, and Lamar Canal.

After Kansas experts pointed out that Mr. Schroeder had allowed the Amity Canal to intercept too much Fort Lyon return flow and certain other matters, Schroeder made several other model changes which Colorado characterized as "minor." Colo. Reply Br. at 56. These were part of the calibration process of the Colorado Revised Test Model, and were intended to address his model's over-prediction of consumption below John Martin Reservoir, and the Kansas Revised Model's over-prediction of streamflows at Lamar. Kansas states that it is "open" to considering at least one of the changes, but Kansas did not respond technically because the changes were raised first on rebuttal, and some were undocumented except in the computer code itself. The changes do not appear to be substantial, e.g., accounting for exchanges that occurred after the transfer of shares in the Rocky Ford Canal to municipal use, and using actual recorded Lamar power plant discharges into the Lamar Canal rather than predicting such diversions, and should be matters that experts can agree upon. Nonetheless, the evidence is probably insufficient to order them at this time.

G. Calculation of Model Demand.

In the H-I model, the demands for water, i.e., surface water diversions, are predicted by a subroutine known as GET. RT Vol. 227 at 51. The diversions thus predicted are

then passed to another subroutine termed LAND, and distributed among consumptive crop use, canal seepage, losses, etc. *Id*. In prior versions of the model, the same acreage figure was used for the most part in both of these subroutines, that is, to predict diversions as well as to determine consumptive use. RT Vol. 227 at 52-53. For the 1986-94 version of the H-I model the acreage figures used in connection with both of these subroutines are found in Colorado Exhibit 1353, Table 1, Col. 1. RT Vol. 227 at 52. For the 1995-96 version of the model, the acreage figure was 309,654. Colo. Exh. 1353, Table 1. Mr. Schroeder changed this methodology, using a different acreage figure to determine demand from that which was used for consumptive use. RT Vol. 227 at 51-53. The reason for the change was to recognize new lands that had been found in Colorado's 1998 acreage study to be irrigated by wells only, i.e., the "sole source" acreage. Colo. Exh. 1353, Table 1. Previously these lands had been included in the model's demand for surface water diversions. Colo. Exh. 1353, Table 1; RT Vol. 225 at 118-19, 121-23; RT Vol. 227 at 51-52.

For the GET subroutine to determine surface water demand, Mr. Schroeder included the total amount of acreage that "could" receive surface water irrigation, i.e., 295,336 acres. Colo. Exh. 1411, Table 1. This figure did not include the "sole source" lands, i.e., lands irrigated by wells only. *Id*. Kansas described this as a "significant change," one that increased the amount of surface water on the acreage used to calculate consumptive use, thereby causing extra water to "pile up" in the canal service area and leading to reduced impacts from well pumping. Kan. Opening Br. at 45. Colorado, on the other hand, treats the change simply as a "refinement to the calculation of

demands in the model," that recognizes that the demand for surface water may be different from the total acreage irrigated. Colo. Reply Br. at 55.

Colorado states that Kansas seems to misunderstand the nature of Mr. Schroeder's change. Perhaps that is so, although the record is not clear. Kansas says that Schroeder used 298,835 acres to determine demand, but 28,165 acres less to calculate consumptive use. Kan. Opening Br. at 44. Kansas provides no citation to the record to support this statement, and I have not found testimony to this effect. While Kansas cross-examined Mr. Schroeder on his change, Kansas did not offer any expert testimony of its own. The figure of 28,165 comes from Colo. Exh. 1353, Table 1, and reflects the amount of land that was found not to be irrigated in Colorado's 1998 acreage study, but I have seen no evidence as to how this acreage was treated in the LAND subroutine. Mr. Schroeder's testimony on the subject did not mention nonirrigated lands, but rather dealt with evaluating demand for surface water, and the exclusion of sole source well acreage. I note that the heading in Kansas' Opening Brief refers to the use of nonirrigated acreage to "calculate demand," but their argument relates to the calculation of consumptive use. Kan. Opening Br. at 44.

Comments on the draft of this Fourth Report add to the confusion surrounding this proposed model change. Kansas states that it leads to the anomalous procedure of using a greater and permanent acreage to calculate demand for surface water than the annually determined acreage used to calculate the consumption of the same surface water. Given the current state of the record, Colorado suggests in its comments on the Draft Report that "this is an issue that should be left for the future." I

agree. I do not feel confident from the evidence at hand in trying to make a decision on such a technical modeling issue. Once the other modeling changes are made, depending upon Court approval, experts from both states should evaluate Mr. Schroeder's proposed change and try to find the best way to deal with this matter.

SECTION VIII

CONTESTED DRY-UP CREDITS

Kansas challenged certain of the consumptive use credits included in LAWMA's 1997-99 Replacement Plan as approved by Colorado. The plan included credits attributed to LAWMA's acquisition of all or a portion of the shares of the Sisson-Stubbs Ditch, X-Y Canal, Fort Bent Ditch, and the Highland Canal. Common to all of these water rights acquisitions were issues over the amounts of land historically irrigated, and the consumptive use of water attributed to the acquired shares. Additionally, Kansas complained that the volumetric limits accepted by Colorado for the calculation of Highland Ditch credits permitted an expansion of historic use, and raised further issues related to possible subirrigation on alfalfa fields claimed for dry-up.

In December 2002 LAWMA filed an "Application for Change of Water Rights and Plan for Augmentation" with the Colorado District Court, Water Division No. 2 ("Water Court") as required by Colorado law. Colo. Exh. 1468; Kan. Exh. 1123, Rules 5 and 6. This Application seeks appropriate water rights changes for all of the water rights, among others, that were included in LAWMA's Replacement Plan and contested by Kansas. The Application relates to the acquisition of all of the 7.20 cfs of the Stubbs Ditch water

right; 67 cfs of the 69 cfs X-Y Canal water right; 2250 shares of the total number of 11,651.2 Fort Bent shares; and 55.95 cfs of the 62.5 cfs Highland Canal water rights. Colo. Exh. 1468, pp. 2, 4. 11, 16. The consumptive use credits for these rights will be determined by the Water Court, and the Application states that such credits "will be left undiverted in the river." Colo. Exh. 1468 at 24-25. The issues raised by Kansas will be before the Water Court, including strict standards for monitoring and verifying lands claimed for dry-up.

Kansas suggests that proceedings before the Colorado Water Court may not provide the protection to which it is entitled under the compact, and that these dry-up issues should be decided by the Supreme Court on my recommendation. I do not agree. The Arkansas River Compact states that, except as otherwise provided, "nothing in this Compact shall be construed as supplanting the administration by Colorado of the rights of appropriators of waters of the Arkansas River in said State as decreed to said appropriators by the courts of Colorado. . . . " Article VIA(2). Colorado has established a system of Water Courts, with specialized water judges, to examine precisely the kind of issues now involved in the LAWMA acquisition of rights. Indeed, all transfers and changes in water rights must be approved under Colorado law by the Water Court. The LAWMA application provides that the replacement water supplies, for which approval is sought, are intended to replace all out-of-priority stream depletions to senior surface water rights in Colorado that are caused by LAWMA well pumping, and also to replace "all stream depletions which would materially deplete the waters of the Arkansas River in usable quantity or availability for use to the water users in Kansas under the

Compact." Colo. Exh. 1468 at 21. The application seeks adjudication of an augmentation plan that "assures compliance with the Arkansas River Compact." *Id.* at 2. To be sure, these various dry-up issues could be decided by the Supreme Court within the parameters of this case. But that would not obviate the Water Court proceedings because senior surface rights in Colorado must still be protected from depletions caused by LAWMA's pumping. What would occur is the possibility of inconsistent judgments between the Colorado courts and the Supreme Court, surely a result to be avoided if possible.

I find that it is not necessary, at this time, for the Supreme Court to decide the final amount of credits that should be allowed in LAWMA's 1997-99 Replacement Plan. Compact compliance for 1997-99 is recommended in this Report without having to rely upon the full amount of LAWMA's claimed credits. That finding can be supported on the basis of Kansas evidence which does not take into account disputed replacement credits. Moreover, future compact compliance, as recommended in Section IX, will be determined over a longer period of time sufficient for the Colorado courts to act. I find, therefore, that the final judgment of the Colorado Water Court, after any appeals, should be used to determine the amount of credits allowed in LAWMA's 1997-99 Replacement Plan, and ultimately applied toward compact compliance, as determined using the H-I model. Credits not subject to Water Court approval, or calculated outside of the H-I model, shall be determined in accord with Colorado's Use Rules and the implementation procedures described in this trial segment. None of these determinations, however, precludes Kansas from seeking review under the Court's original jurisdiction.

Moreover, I find that major Colorado canal companies are likely to protest or appear in the LAWMA Water Court proceedings, and that these canals have essentially the same interests as Kansas in preventing any expansion of use by LAWMA. RT Vol. 254 at 143-44, 147; RT Vol. 257 at 40-41. The Amity Canal, in particular, is expected to be a major objector. Amity has a relatively small number of wells and relies primarily on river flows. RT Vol. 257 at 40. Even upstream junior rights holders have an interest in preventing any enlarged use under the rights acquired by LAWMA. They can be affected by what is termed a "rebound call." RT Vol. 254 at 147. Any expansion of prior use reduces return flows and the supply available to downstream senior rights like the Buffalo Canal [holding a 1885 priority]. In turn, this increases the "calls" against upstream junior rights requiring them to pass more water downstream.

SECTION IX

PROSPECTIVE COMPACT COMPLIANCE MODELING

Both states applied the H-I model to assumed future conditions in an effort to test the long-term adequacy of Colorado's Use Rules. While the Use Rules and Colorado's replacement water program were fully in effect for the 1997-99 period, it is undisputed that these were wet years, and not representative of typical conditions that may be expected in the future, or that were experienced generally in the past. Kan. Exh. 1093 at 6; RT Vol. 246 at 27. Kansas, in particular, did not believe that these were "good years" by which to test the viability of the Use Rules. RT Vol. 237 at 43. Kansas maintained that the low Stateline depletions found in 1997 and 1999 were "mostly a function

of the hydrology of those years and not the operation of the replacement plans." *Id.* at 44. The issue, of course, is whether the Use Rules under all conditions will maintain compact compliance, namely, that Arkansas River flows "shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas. . . . " Art. IV-D.

In making these prospective analyses, both states assumed that the Colorado Use Rules would remain in effect in their present form, and that replacement water would be provided in accordance with the Rules. The results of the Kansas prospective analysis, using 1950-94 hydrology, showed that Colorado would be short in meeting its compact obligations by an average of 11,036 acre-feet per year. Kan. Exh. 1093, Table 15, Col. 32. A shortfall was present in each year, with depletions ranging between 1953 and 19,137 acre-feet. *Id.* On the other hand, the Colorado model results for the same 1950-94 simulated period showed surplus deliveries at the Stateline averaging 5175 acre-feet per year. Colo. Exh. 1408, Table 14b.

The disparate results are directly related to the different modeling assumptions and changes made by each of the states. The modeling approaches employed by each state are discussed in the following sections, but I have concluded that the modeling efforts of both states involve far too much speculation, as well as modeling changes that may well depart from actual conditions, to provide reliable forecasts of whether Colorado's Use Rules will be effective in assuring future compact compliance. Instead, my recommendations for determining compact compliance are found in Section X.

A. Kansas' Prospective Compliance Model.

The Kansas prospective compliance analysis was based upon its revised H-I model used for the 1997-99 period, but with certain additional modifications. Kan. Exh. 1093 at 51. A repeat of the 1950-94 hydrology was retained, along with current institutional conditions (e.g., the 1980 Operating Plan, current levels of transmountain imports, operation of the Winter Water Storage Program). However, changes were made with respect to assumed levels of pumping; the distribution of pumping on the basis of "unmet demand"; the use of permitted and decreed groundwater acreage; and the use of the Penman-Monteith method to establish potential evapotranspiration in place of the Blaney-Criddle procedures.

1. Assumed Future Pumping.

Kansas assumed that future pumping would average 130,000 acre-feet per year over a repeat of 1950-94 hydrologic conditions. Kan. Exh. 1093 at 52, Table 15. The maximum level of pumping is 200,000 acre-feet, which is reached five times during the 1950-94 period. *Id.*, Table 15. Each of these five years was listed as "very dry." Colo. Exh. 1408, Table 11. However, recent dry year experience in 2002 would indicate that the amount of replacement water available would only permit pumping in the order of 100,000 acre-feet. RT Vol. 254 at 113-14. During Mr. Books' examination, I noted that high levels of pumping in the order of 200,000 acre-feet had not been seen for a long time, and looking to the future, "we're not likely to see that much again." RT Vol. 241 at 111. Mr. Book generally agreed. Apparently the higher estimates were made when Kansas thought that more replacement water would be available. *Id.* at 112-13. Nonetheless, Mr. Book still believed

that the 130,000 acre-feet average was realistic. *Id.* at 113. Historical pumping from 1970-94, after well development had stabilized, averaged about 170,000 per year, with a peak of about 287,000 acre-feet. *Id.* at 111-12; Kan. Exh. 1093 at 58. However, those numbers reflect pumping before replacement water was required. The Kansas estimates of pumping assume that sufficient amounts of replacement water will be available, and will not act additionally to constrain pumping. RT Vol. 237 at 71-72; RT Vol. 254 at 55-56. Because of this assumption, Kansas experts testified that their analysis was "somewhat insensitive" to the exact magnitude of pumping. RT Vol. 237 at 72, 80. But as a corollary, the availability of replacement water becomes a critical premise. Colorado's estimate of future pumping, as constrained by the availability of replacement supplies, averaged 111,047 acre-feet per year. Colo. Exh. 1408, Table 13.

2. Kansas' Redistribution of Pumping.

A more important part of Kansas' prospective compliance analysis lay not in the amount of assumed pumping, but rather in the way in which the model distributes pumped water. In all prior versions of the H-I model, the use of groundwater had been based on the general assumption that if a section of land contained a well, all of the acreage within that section was assumed to be irrigated with groundwater. RT Vol. 239 at 6, 11-12. This was reflected in the model as a percentage of the acreage in a ditch service area that was irrigated with groundwater. For example, with respect to the Bessemer Canal, the model assumed that 100% of the area was irrigated with wells, while for the Fort Lyon Canal the percentage was only 30%. Kan. Exh. 1093, Table 4; Colo. Exh. 1353, Table

2; RT Vol. 238 at 152; RT Vol. 239 at 12. In determining compliance for the 1997-99 period, both states used versions of the H-I model that included this historic pattern of groundwater use. RT Vol. 238 at 112. However, in its prospective compliance model, Kansas made a significant change, described as "very important" by Mr. Sullivan. RT Vol. 263 at 105. Indeed, if the Kansas prospective compliance model had represented the same amounts and distribution of pumping used by Colorado, the Stateline depletions forecast by Kansas would have been reduced from an average of 11,036 acre-feet per year to approximately 2500 acre-feet. RT Vol. 263 at 107, 109.

In its prospective compliance analysis, Kansas distributed pumping on the basis of "unmet demand." RT Vol. 241 at 121-22; RT Vol. 238 at 18-19; Colo. Exh. 1408 at 62-63. This distribution included lands irrigated solely by groundwater, as well as lands irrigated with supplemental groundwater. Kan. Reply Br. at 57. This was an effort, according to Kansas' experts, to eliminate what they called "excess pumping" in the model. RT Vol. 238 at 16-22, 117, 144. In reality, the issue relates to the consumptive use of groundwater as simulated in the model. Higher consumptive use leads to greater Stateline depletions, and lower consumptive use leads to lower depletions. RT Vol. 238 at 22. Kansas experts testified that prior versions of the model allowed groundwater to be "stacked up" on top of surface water, with the result that the consumptive use of groundwater was too low; or put conversely, that too much pumped water was simulated as returning to the river. RT Vol. 237 at 140; RT Vol. 239 at 11, 15, 49. They said that in the historic run of the model, the pumping input file did not fit the demand for water, and that a better distribution of groundwater was needed. RT Vol. 238 at 18-19, 144.

Kansas produced an analysis which purported to show that in the Colorado Test Model only 26% of all pumped water was consumed, against an expected consumptive use of approximately 65%. Kan. Exh. 1119*. That would mean that the model simulated 74% of pumped water as being returned to the river. In the Kansas Revised Model (used by Kansas for 1997-99 compliance), the analysis concluded that 43% of pumped water was consumptively used. *Id.* Only in the Kansas prospective compliance model did the consumptive use of well water reach usual values. RT Vol. 238 at 97-98.

The Kansas experts understood that Colorado farmers did not actually pump water just to run it down a furrow and back into the river. They recognized the issue of "excess pumping" as an artifact of the H-I model. When asked, however, why this problem surfaced only now, after 12 years of trial, the Kansas response was a bit worrisome. They testified that their understanding of the model had "matured through time as we better and better understand the complexities of the model." RT Vol. 239 at 28. Yet this is a model which was developed by Kansas, which has been defended by Kansas experts over the years, and which has been used throughout three trial segments to determine Stateline depletions.

If there is a concern over the way in which the model simulates the consumptive use of groundwater, the solution proposed by Kansas seems to have its own problems. In an effort to better match pumping to unmet demand, the Kansas revisions reallocate future pumping among certain canals in ways that are quite contrary to actual historic records. Nor is there any evidence that these changes might be expected to occur in the future. For example, for projected 1950-94 conditions, the Kansas

model shows no pumping at all for most years by the Catlin Canal, while in the 1997-99 period it actually pumped over 5000 acre-feet each year. Colo. Exh. 1408, Tables 6 and 10; RT Vol. 246 at 106-07. Again, the Lamar Canal shows no pumping at all during the 45-year period, except for 252 acre-feet in a single year. Colo. Exh. 1408, Table 10. During 1997-99, the Lamar Canal actually pumped between 3428 and 6428 acre-feet. Colo. Exh. 1408, Table 6. Other canals showing many, if not most, years of no pumping were the Oxford, Las Animas and Baldwin-Stubbs. Colo. Exh. 1408, Table 10. On the reverse side, the Fort Lyon Canal shows minimum pumping of 22,778 acre-feet and ranging as high as 62,357 acre-feet, while actual pumping in 1997-99 was only 12,169 to 17,098 acre-feet. Colo. Exh. 1408, Table 10; Colo. Exh. 1408, Table 6. The Colorado Canal also showed a substantial increase, with pumping as high as 15,936 acre-feet and never below 4105 acre-feet, even though most of its lands have been dried up. Colo. Exh. 1408, Table 10. During 1997-99 its actual pumping fell between 2347 and 3029 acre-feet. Colo. Exh. 1408, Tables 6 and 10.

Mr. Sullivan testified that the pumping assigned to the Colorado Canal was "not intended to be a prediction of how much water is ... going to be pumped under the Colorado Canal in the future." RT Vol. 239 at 130. He simply distributed pumping to meet unmet demand, and said that he "could have distributed the pumping to some other unmet demand under different canals." *Id.* The same was true with respect to the Fort Lyon Canal which "could have been redistributed elsewhere." *Id.* at 131. In the Kansas prospective compliance model, Sullivan simulated about 10,000 acre-feet of excess pumping annually. While his analysis reflected a particular distribution, he said the

"exact ditch under which it occurs is not crucial to the analysis." RT Vol. 239 at 117, 101-03. Yet the point of the model is to simulate actual conditions, and the model must be anchored to reality as closely as possible. Otherwise, any number of model adjustments can be made simply to produce a desired result. That is not to say that the Kansas pumping distributions here were not aimed at correcting what they perceived to be a genuine shortcoming in the model. Indeed, Mr. Sullivan's goal was to "try to get the model to reflect what is actually going on." RT Vol. 238 at 99-100. However, it is hard to understand how such departures from reality accomplish that objective.

3. Kansas' Irrigated Acreage.

The Kansas prospective compliance model estimated the amount of acreage irrigated by wells using the decreed and permitted acreage for all wells in existence in 1998, including both active and inactive wells. RT Vol. 239 at 23-24, 49. The amount used was 147,308 acres. Kan. Exh. 1093, Table 4. Generally speaking, distributing groundwater over a larger area causes it to become more consumptive and increases depletions. RT Vol. 239 at 51-60; RT Vol. 244 at 89-93. This acreage was also used to calibrate the revised Kansas model for 1950-94, even though admittedly there were substantially fewer wells in the 1950s and 1960s. RT Vol. 239 at 22-23. However, Mr. Sullivan testified that simulating a larger amount of acreage in the model than actually existed would not impact model results, so long as farmers were not applying water in excess of demand. RT Vol. 239 at 24. Without excess pumping, he said the model was not sensitive to the amount of acreage. *Id.* at 24-25. Nonetheless, with regard to this specific model input, actual acreage figures were

available from Colorado's 1998 study. And even if Kansas disagreed with those results, its own study showed only approximately 110,000 acres irrigated by wells for the 1997-99 period. Kan. Exh. 1093, Table 3. This figure compares with 147,308 used by Kansas in its prospective compliance analysis.

4. LAWMA Replacement Sources.

Kansas assumed that 12,021 acre-feet annually would be available from LAWMA's main stem replacement sources for each of the 45 years in the prospective analysis. RT Vol. 246 at 109-10. This was the amount included in LAWMA's Replacement Plan application and approved for 1999. RT Vol. 239 at 132-33. Colorado points out, however, that 1999 was a very wet year, and it is unrealistic to project such replacement supplies, which depend upon river flow, to be available in all years. Indeed, Kansas' own expert agreed that these main stem sources would not produce 12,000 acre-feet in a dry year. RT Vol. 239 at 135. He also agreed that depletions shown by the prospective compliance model would be less if the 12,000 acre-feet were not available. *Id.* at 140-142. As represented in the H-I model, LAWMA's total yield from its main stem sources in 2002, a very dry year, was only 5923 acre-feet. Colo. Exh. 1471.

B. Colorado's Prospective Compliance Analysis.

Colorado made three compliance analyses to test the adequacy of its Use Rules. Two of these were made by Mr. Schroeder, the first using his version of the H-I model known as Test Model, and the second using the Revised Test Model. Colo. Exhs. 1353, 1411. Both of these models

were calibrated to a later and shorter period, namely 1970-94, than had been previously used by both states. Prior versions of the model had been calibrated using the period of 1950-94. In the calibration process, Mr. Schroeder also made a number of model changes, including the development of different WANT factors for the canals downstream of John Martin Reservoir, and calibrating that area over an even shorter period of 1980-94. RT Vol. 264 at 110-11. These more recent years were not representative of long-term hydrology. All but one year after 1980 were classified as average or wet. Colo. Exh. 1408, Table 11; RT Vol. 265 at 72. In his test models, Mr. Schroeder also based his irrigated acreage from 1969-94 on the 1998 Colorado study figures, even though half the wells were inactive in 1998. RT 260 at 141-42. And in the years prior to 1969, he stepped down the irrigated acreage even further. *Id.* at 142, 144. In any event, the results of both test model runs showed no depletions of usable Stateline flows, taking into account accretions. Colo. Exh. 1353, Table 6; Colo. Exh. 1411 at 37-38, Table 6a at 57. These results received little attention during the trial, perhaps because of the Kansas view that the analyses were oversimplified, since the replacement waters required by the presumptive depletion factors were simulated to be replaced at exactly the locations where the depletions occurred. RT Vol. 243 at 83-84. Of course, this is not what actually happens.

The other Colorado prospective compliance analysis was prepared by Mr. Straw. It, too, showed that application of the Use Rules resulted in sufficient replacement of depletions to usable Stateline flows. RT Vol. 254 at 20. However, one of Mr. Straw's key assumptions with respect to the amount of future pumping was strongly disputed by Kansas. Based on the hydrology of the five years of 1997

through 2001, and the measured amounts of pumping during each of those years, Straw developed supply and demand curves for future amounts of pumped water. Colo. Exh. 1408, Fig. 2; RT Vol. 254 at 56-65. The supply curve represented the amount of replacement water estimated to be available, which acted to constrain the actual use of pumped water. In projecting future supply and demand, he classified each of the years in the 1950-94 period as very wet, wet, average, dry and very dry, which were derived from 1997-2001 conditions. Colo. Exh. 1408, Table 11. The years 1997 and 1999 were ranked as very wet, 1998 and 2000 as wet, and 2001 as average. The projected results of his supply-demand analysis are shown in Table 12 of Colorado Exhibit 1408. The highest demand for groundwater is 182,463 acre-feet under 1954 conditions. However, actual pumping is limited by the supply of replacement water deemed to be available under 1954 conditions, namely, 104,710 acre-feet. Conversely, the highest supply of available replacement water is 158,839 acre-feet shown in 1980. But under those hydrologic conditions, not as much pumped water is deemed to be needed and the demand, and hence the pumping, is only 102,850 acre-feet. *Id.* As a result of this analysis, Mr. Straw's estimated future pumping ranges between approximately 100,000 and 120,000 acre-feet.

While in theory the approach used by Mr. Straw appears to be sound, Kansas experts properly objected that the five pumping data points plotted in Fig. 2 (Colo. Exh. 1408) are not sufficient to support specific values over 45 years. There is only one data point to represent pumping in an average year, and none in dry or very dry years. Mr. Straw also assumed that no additional replacement supplies would be available in the future from

agriculture, and that water from the municipalities could be obtained only in wet and very wet years. RT Vol. 254 at 66, 71-79. While these assumptions may turn out to be true, there can be no certainty about agricultural conditions. Yet those assumptions are critical to the Colorado estimate of future pumping. As Kansas notes, the Colorado estimates of pumping were in fact exceeded in two of the five recent years. RT Vol. 262 at 65; RT Vol. 254 at 81. Mr. Straw's analysis was also based upon use of Colorado's Revised Test Model, and is subject to the concerns about that version of the H-I model. Colo. Exh. 1408 at 61-72; RT Vol. 246 at 134-35.

C. Conclusions.

The Kansas prospective analysis is not sufficient to prove that the 1996 Use Rules will not assure compact compliance. I do not recommend, as requested by Kansas to prevent future depletions, that Colorado be required to place water in the Offset Account in the amount of 15% of pumping (in addition to the requirements of the Use Rules). Kan. Opening Br. at 85; Kan. Reply Br. at 71. Depletions of usable Stateline flow for the whole period of 1950-96 have been determined to be 428,005 acre-feet – an average of a little under 10,000 acre-feet per year. These are the depletions without *any* replacement water. Yet the Kansas prospective compliance model shows depletions of 11,036 acre-feet per year even *after* the provision of replacement water as required under the Use Rules. Unless all of the previous Kansas modeling is seriously in error, the prospective compliance model results do not appear realistic. The H-I model results for 1995-96, agreed to by Kansas, showed average depletions of only 3968 acre-feet per year. Jt. Exh. 183. The Use Rules were in effect only

for a few months of this period, and then required only 60% replacement water. The Kansas prospective analysis also shows depletions in *every* year. Yet its own modeling for 1997-99 showed compliance in two of the three years. Kan. Exh. 1093, Table 14.

The Use Rules have been fully in effect since 1997, and I have found that Colorado did meet its compact obligations during the 1997-99 period. However, Kansas has a valid concern that these years were exceptionally wet and may not demonstrate that the Use Rules will be adequate over the long term. In this trial segment we have seen the extremes of hydrologic conditions, from very wet years to one of the driest years of record in 2002, yet the Kansas fears have not come to pass. The Colorado pumping response has been far different from the past when replacement supplies were not required. In the dry river conditions of the 1970s, farmers simply turned to the pumping of groundwater, and pumping levels soared to more than 250,000 acre-feet per year. But in 2002, applications to pump were cut dramatically, limited by the fact that sufficient replacement supplies were not available. More experience under the Use Rules is still required, but if the Rules should prove in the future not to supply adequate replacement water, then Colorado will have to adjust in order to fully meet its compact obligations. And from the testimony of Mr. Simpson, head of Colorado's Division of Water Resources, this is a fact well understood. RT Vol. 231 at 113-14, 138; RT Vol. 270 at 143-44, 161-62, 164.

Turning now to the Colorado prospective compliance analyses, I also find that they are not sufficient to prove that the 1996 Use Rules, as they have been applied, will

assure future compact compliance. Rule 4.2 of the Use Rules provides presumptive depletion factors of 30% for supplemental wells, 50% for sole source wells, and 75% for sprinkler irrigation systems. Since 1997, replacement water in those percentages has been required. However, Kansas has never been convinced that these replacement percentages are adequate. They were developed through the earlier 1950-85 version of the H-I model which is no longer appropriate. RT Vol. 231 at 126-27. Kansas maintains that the depletion percentages should more closely reflect actual consumptive use. Nonetheless, Kansas does not advocate making a change in the presumptive depletion factors themselves, but instead seeks additional water to be added to the Offset Account directly for the benefit of Kansas. RT Vol. 237 at 146-47; RT Vol. 262 at 85-86. The presumptive depletion factors are designed to protect prior rights in Colorado, as well as Stateline flows for Kansas, and the Kansas experts recognize that a wholesale change in these factors may be an inefficient way to get water to Kansas, if more replacement is required. It should be noted, however, that the Use Rules do give the State Engineer the authority to revise these presumptive stream depletions if he determines that to be necessary, although that authority has not yet been exercised. Rule 4.3. Nonetheless, the intentions of the State Engineer to assure compact compliance, whatever actions that may entail, are discussed in the following Section.

SECTION X

MEASURING COMPACT COMPLIANCE

It is the Kansas position that the H-I model should be used on an annual basis to determine Colorado's compliance with the Arkansas River Compact. Kan. Opening Br.

at 85, Kan. Exh. 1093 at 5. Compliance accounting would run from the beginning of April to the end of March in the following year. Recognizing that recent patterns have shown accretions to occur during the irrigation season and depletions during the winter, Kansas proposes that accretions may be used to offset depletions during the April-March accounting year. Kan. Opening Br. at 64, 66. I find, however, that the H-I model is not sufficiently reliable on a short term basis to determine compliance as recommended by Kansas.

A. Reliability of H-I Model.

Modeling the Arkansas River Basin in Colorado is extraordinarily difficult, and perhaps unprecedented. Yet all of the experts from both states have testified that the use of a computer model is the only way to estimate what the river flows would have been in the absence of post-compact pumping. The modeling effort must represent highly variable river flows over some 150 miles to the Kansas Stateline; the intervention of a major federal reservoir; storage and releases from numerous large private storage reservoirs; transmountain flows brought through tunnels from the west slopes of the Rocky Mountains; surface diversions initially made by some 23 canals operating under a priority system that regulates diversions by the hour; the reuse of all surface flows; ungaged tributary inflows and torrential summer thunder storms; consumptive use of various crops as well as phreatophytes along the river; canal and lateral seepage; irrigation return flows to the river, both on the surface and from groundwater; pumping by upwards of 1000 wells; and the fallowing of land to provide replacement water to offset the impacts of pumping. And the model is then asked to

estimate what the usable Stateline flows in the river would have been at any point in time if there had been no postcompact well pumping. Kansas commends the H-I model for doing a "remarkable job," and, indeed, it may perform as well as can be expected under these most complex circumstances. Kan. Reply Br. at 66. At the outset of the trial, one of the distinguished pioneers[16] in computer modeling explained the difficulties of the task. He went on to say that the experts of both states were "extremely well regarded" and among the "best . . . in the country." First Report at 232. But he also cautioned that large errors could be expected in this complex modeling process.

In my view, the Kansas statistical evidence does not convincingly support the accuracy or reliability of the H-I model on an annual or short term basis. Mr. Steven P. Larson, Kansas' chief modeling expert over the last decade of these proceedings, testified that the revised Kansas H-I model provides a "reasonable estimate" of depletions on an annual and even on a monthly basis. RT Vol. 243 at 118-19, 121. However, when pressed about the accuracy of the model results, he said:

> "Well, the term 'accurate' is a little difficult to deal with since it implies that we know what the depletions are and we know, therefore, based on these calculations how far the model might depart from something that's been measured. But since we don't have measurements of the depletions, we can only provide estimates. As to the

[16] Dr. Robert Allan Freeze, see First Report at 232-33.

> uncertainty, I don't know what the uncertainty is."[17] *Id.* at 117-18.

The ability of the H-I model to predict diversions from the river, that is, to match model predictions with actual observed diversions, is considered a key to the accuracy of its results. Addressing this measure of the accuracy – or error – of the Kansas revised model, Mr. Larson referred to the tabulation in Kan. Exh. 1113 at page 30. (Appendix Exh. 12.) RT Vol. 243 at 121-22; 124. That exhibit shows that the Kansas model mostly over-predicts diversions in the earlier years, and since 1982 has consistently under-predicted. Colo. Exh. 1412, Table 1, at 34. The maximum under-prediction occurred in 1995 by 22.4%, while the maximum over-prediction occurred in 1960 in almost the same percentage, i.e., 22.2%. RT Vol. 243 at 122-123. These are the extremes. Mr. Larson stated that the percentages in this table, however, may give an indication of the percentage of error one might expect in the model results. RT Vol. 243 at 125-26, 131-32. He concluded that the uncertainty in the model estimates of depletions and accretions could be expected to be on the order of "plus or minus 10 or 20 percent." RT Vol. 243 at 137. Another tabulation demonstrates that the model does not predict "as well" at the extremes, "especially for wet periods." RT Vol. 243 at 80-81. Over the full period of 1950-99, predicted and observed diversions were virtually the same, but during the relatively wet period of 1980-99, the model

[17] With respect to an earlier version of the H-I model, Mr. Larson testified: "I think [the model] provides the best estimate that we can. We don't know what the depletions are, so we can't directly assess that accuracy." RT Vol. 164 at 44.

under-predicted diversions by about 8%, and by 14% in the very wet period of 1995-99. During the drier years of 1950-79, the model over-predicted by 7%. Kan. Exh. 1113 at 28. Under-predicting diversions tends to over-predict Stateline depletions, and vice versa. RT Vol. 231 at 70-74; RT Vol. 265 at 128; Colo. Exh. 1391 at 2; Colo. Exh. 1412 at 7.

The annual variability of the model results again shows up in the comparisons between observed and predicted stream flows. The ability of the model to accurately predict stream flows is also important in estimating depletions. Colo. Exh. 1410 at 45. Over the 1950-99 period, predicted stream flows at the Stateline averaged 144,490 acre-feet per year, while observed flows were 149,296, an average difference of about 3%. Kan. Exh. 1113 at 13. During the period of 1950-94, average predicted and observed flows were essentially the same, i.e., 125,431 and 125,087, respectively. *Id.* Yet individual years show a good deal of variation. For example, in the last 10 years since 1990, the model under-predicted streamflow in 5 years, and over-predicted in 5 years, all interspersed. Kan. Exh. 1113 at 17. The largest under-prediction was 155,373 acre-feet in 1998; the largest over-prediction was 60,050 acre-feet in 1995. *Id.*

All of these comparisons point to the need to smooth out the model results, and to account for the model's tendency to over-predict depletions in wet years, and to under-predict in dry years. Kan. Exh. 1113 at 28, 30; RT Vol. 265 at 129.

Dr. Charles M. Brendecke testified as a rebuttal expert for Colorado on the issue of model reliability. Dr. Brendecke holds a Ph.D. from Stanford University in civil engineering.[18] Since 1986 he has been a principal and president of Hydrosphere Resource Consultants. Earlier he taught at both Stanford and the University of Colorado. Dr. Brendecke has been an expert for Wyoming in the recent case of *Nebraska v. Wyoming* involving the Platte River, and has also been a consultant to the Special Master on technical issues in the case of *Texas v. New Mexico*. He has had extensive modeling experience on the North Platte, Pecos, Rio Grande, Snake and Gunnison Rivers.

Dr. Brendecke presented an error analysis of the H-I model results. He was critical of the Kansas approach to compare predicted diversion and streamflow data with observed amounts over the long period of 1950-94. He said that under-predictions and over-predictions can cancel each other out over a long period of time, so that the result merely shows the "long-run average error." RT Vol. 258 at 103. It does not tell you how accurate the model may be in any given year. RT Vol. 257 at 169-70. Dr. Brendecke, therefore, applied two different statistical approaches to the monthly data for predicting diversions, i.e., calculating the mean absolute error, and the root mean squared error. These results are shown in Colorado Exhibit 1410, Table 3.3a, 3.3b at 34. (Appendix Exh. 13.)

Dr. Brendecke tabulated the average monthly diversions predicted by the Kansas version of the H-I model for

[18] His expert qualifications are found in Colorado Exhibit 1440.

each of the canals over the 1950-94 period. These were then compared with actual observed diversions over the same period of time. Over the full 540 months of the 1950-94 period, predicted and observed diversions matched almost perfectly. But Dr. Brendecke testified that a "more appropriate" evaluation method was to employ the concept of the "mean absolute error." RT Vol. 257 at 170, 173-74. This was designed to show what the difference, or model error, might be in any random month. *Id.* at 174. Dr. Brendecke averaged the amounts of monthly differences without regard as to whether they were over-predictions or under-predictions. *Id.* For example, with respect to the Bessemer Canal, with monthly diversions averaging 5076 acre-feet, one could "expect to be off" by 22% or 1096 acre-feet in any random month. *Id.*, Colo. Exh. 1410, Table 3.3b at 34. The analysis shows some of the other major canals off by even larger amounts and percentages: Colorado Canal, 3001 acre-feet or 41%; Catlin Canal, 1804 acre-feet or 25%; Fort Lyon Canal, 4756 acre-feet or 25%; Amity Canal, 2585 acre-feet or 40%. Colo. Exh. 1410, Table 3.3b at 34.

Dr. Brendecke also performed another calibration statistic designed to remove the positive and negative sign in the error and focus on the magnitude of the error, called the "root mean squared error." RT Vol. 257 at 174. This is also designed to address the problem of errors cancelling each other out over a long period, and showed even greater random error than the mean absolute error approach. RT Vol. 257 at 175; Colo. Exh. 1410, Table 3.3b at 34.

Dr. Brendecke also prepared an error graph comparing the annual Stateline flows predicted by the model with those actually observed over the 1950-98 period. There are under- and over-predictions throughout the period, but in

recent years some of the differences are exceptionally large. Colo. Exh. 1410, Table 3.2a at 29. For the years 1990 through 1994 the results were very close, but in 1995 the model over-predicted Stateline flows by more than 50,000 acre-feet, while in 1996 and 1998 it under-predicted by 100,000 and over-predicted by 150,000 acre-feet, respectively. Colo. Exh. 1410, Table 3.2a; RT Vol. 257 at 159-60. These figures, he said, highlighted the danger of using the model "on any kind of short-term basis for making decisions." RT Vol. 257 at 160. The mean absolute error in model predictions of flow at the Stateline was 20,500 acre-feet, or 17%. Colo. Exh. 1410, Table 3.8a at 44.

It should be noted, however, that the error in predicting Stateline flows is not the same as predicting depletions under the compact. Depletions are determined by comparing the results of the historical and compact model runs. RT Vol. 257 at 104-06. It was Dr. Brendecke's overall conclusion that the H-I model, as it now operates, should not be used on a "short term basis." RT Vol. 257 at 167, 179. However, he acknowledged that over a longer period of time, perhaps 10 to 15 years, the model could be used to determine compliance. RT Vol. 257 at 194.

While Dr. Brendecke analyzed the data in terms of certain commonly used statistical concepts, there are innumerable exhibits which plainly show that in any given month or year the model predictions of diversions or river flows differ substantially from actual measured data. (For example, see Colo. Exh. 1394; Kan. Exh. 1093.) Only by using longer term averages do the model simulations more closely match historic data. I find that the H-I model is not sufficiently accurate on a short-term basis to be used to determine compact compliance on a monthly or annual basis.

B. Colorado's Compact Compliance Proposal.

Colorado's proposal for determining compact compliance developed gradually throughout this trial segment. It was first mentioned by Hal D. Simpson, Colorado's State Engineer and head of its Division of Water Resources, on the second day of trial, perhaps prematurely at that time but in response to a question of mine. RT Vol. 216 at 102. But on several later occasions, Mr. Simpson added detail to the proposal and responded to concerns and questions raised by Kansas. The final questions were raised during his cross-examination on the last day of trial. RT Vol. 270 at 151, *et seq.*

The Colorado Use Rules, adopted in 1996, provide that the State Engineer shall use "the Kansas Hydrologic-Institutional Model (HIM) . . . or such other method approved by the Special Master, the United States Supreme Court, or the Arkansas River Compact Administration to determine depletions to usable Stateline flow caused by post-compact ground water diversions for irrigation use." Kan. Exh. 1123, Rule 3.4. The Use Rules were approved, after protest and trial, by the Water Judge for Division 2, effective June 1, 1996. Colo. Exh. 1051, Appendix A. Duane Helton, Colorado's expert in earlier segments of this trial, testified for the State Engineer in support of the proposed Rules, stating that the results of the H-I model were reasonable on a long-term basis. Colo. Exh. 1390 at 1. Mr. Simpson testified that it was never his understanding that the model would be used to determine compact compliance on a monthly or annual basis, that the results are not accurate in such a short time frame. Colo. Exh. 1390 at 14; Colo. Exh. 1391 at 1. Changes have been made in the model since the Use Rules were adopted, and indeed, additional changes have been proposed by both

states in this trial segment. However, Mr. Simpson's original opinion has not changed.

In analyzing the "long-term" accuracy of the H-I model, Mr. Simpson examined predictions of streamflows and diversions. Accurate predictions of streamflow and diversions are important to the model's ability to determine Stateline depletions. Colo. Exh. 1391 at 2. He concluded that it was necessary to average streamflow predictions over about 10 years in order to bring the error rate down to approximately 5%. RT Vol. 231 at 111-12. For diversions, it required about 15 years, but he thought "that's too long a period." *Id.* at 112. He settled, therefore, on 10 years as being a "reasonable" period of time. *Id.*

The specific Colorado proposal, as it finally developed over the course of the trial segment, was this: the accounting period would begin with calendar year 1997, the first year that the Use Rules were in full operation. RT Vol. 216 at 103; RT Vol. 231 at 132. The model would be updated annually and run for each calendar year, in the spring of the following year. RT Vol. 231 at 40; RT Vol. 270 at 157-58. Depletions or accretions would be determined annually, and for the first ten years beginning in 1997 (i.e., until 2006) those depletions or accretions would be carried forward to the next year. RT Vol. 231 at 132-133. A simplified illustration of this accounting procedure is found in Colorado Exhibit 1459, included in the Appendix as Exh. 14. In the eleventh year, Colorado would make up any depletions accrued at the end of the ten-year period, or any accretions would be carried forward into year eleven. The process would continue on a moving ten-year basis, dropping year one and adding the year eleven results, dropping year two and adding year twelve, and so forth. RT Vol. 231 at 134. The analysis would be done using the version of

the model approved at the conclusion of this trial segment. RT Vol. 231 at 135.

Essentially, after the startup period, the Colorado proposal calls for an annual accounting, with delivery of any replacement water then due, based on the H-I model annual determinations over the prior ten years. Understandably, however, Kansas was concerned about the first 10-year period. Would Colorado accumulate shortages that would not be replaced until years later, or perhaps be so large that they could not be replaced at all in the eleventh year? Neither scenario appears likely. I have found that Colorado deliveries met their compact obligations during 1997-99, the first three years of the initial ten-year proposal. Even the Kansas modeling shows that accretions exceed depletions over the whole three years by 2819 acre-feet. RT Vol. 241 at 47-48; Colo. Exh. 1411, Table 7c. However, Mr. Simpson testified that if there were a "trend" or a "series of years" of depletions, Colorado would "have to make some adjustment." RT Vol. 231 at 113-14, 138; RT Vol. 270 at 143, 161-62, 164. Colorado could require that additional water be placed in the Offset Account for the benefit of Kansas, or it could adjust the Use Rules. RT Vol. 270 at 144, 162.

The Use Rules provide that additional replacement water may be required. Kan. Exh. 1123, Rule 7; RT Vol. 231 at 130-31. Moreover, the Rules allow the presumptive depletion factors to be increased if necessary to prevent "depletions to usable Stateline flows," although Kansas points out that the procedures for such a change allow for Court review. Kan. Exh. 1123, Rule 4.3. While the presumptive depletion factors worked during the 1997-99 wet years, Mr. Simpson acknowledged that he would have to "wait and see" how they perform in dry years. RT Vol. 231

at 122, 129-30. But he pointed out that the Offset Account acts as a buffer against falling short. *Id.* at 124. The Colorado Legislature has established an ongoing fund of a million dollars, replenished to that amount each July 1. The fund is managed by the State Engineer and the Colorado Water Conservation Board, and may be used to acquire additional replacement water. RT Vol. 270 at 145-46. In fact, the fund was used late in the summer of 2002 to acquire an additional 3600 acre-feet of water to be placed in the Offset Account for Kansas. *Id.* at 146. Mr. Simpson testified that it was not in the interest of either Colorado or its farmers to default in its compact obligations. The state doesn't want "a potential second suit from Kansas," and the farmers "obviously don't want their wells curtailed." RT Vol. 270 at 144. Based upon Colorado's actions in recent years, and upon the testimony of Mr. Simpson, I believe the Court can have confidence in Colorado's ability and determination to provide Kansas with the water to which it is entitled under the compact. In the event of serious failure in the Use Rules, Mr. Simpson testified that adjustments would be made in consultation with Kansas. RT Vol. 270 at 163-64.

Other Kansas concerns were addressed by Mr. Simpson. The Use Rules requiring replacement water would be enforced even though Colorado had built up a net credit. RT Vol. 270 at 158. The only exception would be if John Martin Reservoir were spilling and water was passing Garden City, Kansas. RT Vol. 270 at 159. Depletions and accretions would be determined on an annual basis, and after the initial startup, depletions would be made up in the following year. RT Vol. 232 at 18-19; RT Vol. 270 at 148-49, 158. Mr. Book expressed the need for a cap on accumulated accretions so that accretions occurring in wet

years would not be used to offset much later dry year depletions. RT Vol. 265 at 29-30. No evidence was presented on this matter, but if necessary some type of limit could be included in any decree, taking limited evidence if the states could not agree.

C. Conclusions.

I conclude that the use of the H-I model over a ten-year period, as proposed by Colorado, is necessary in order to achieve reasonably accurate model results; that the Colorado proposal provides a reasonable way to check upon the effectiveness of the Use Rules to prevent material depletions of usable Stateline flows; that on the basis of present evidence the Use Rules themselves, in conjunction with the Colorado proposal, properly provide for compliance with Colorado's obligations under the Arkansas River Compact; that it is the implementation of the Rules, however, that is critical to compact compliance; and that Colorado has committed to make future adjustments in the Use Rules, if necessary, in order to achieve full compact compliance. Kansas contends that Colorado's compliance proposal violates Article V-5E(5) of the compact which states, "There shall be no allowance or accumulation of credits or debits for or against either State." I disagree. The proposal is simply the most accurate way of determining the actual Kansas entitlement under the compact.

SECTION XI

CONTINUING JURISDICTION AND REQUEST FOR A RIVER MASTER

One of the most vexing issues left to be decided in this case is how to reasonably assure that Colorado will continue to meet its compact obligations. I have found in this Report that the replacement water program implemented by Colorado during the three-year period of 1997-99 provided sufficient flows at the Stateline to offset the impacts of its upstream pumping, namely, that its Use Rules brought Colorado into compact compliance for those years. This is the last period for which complete data were available, and ordinarily my finding, if confirmed, would be sufficient to enter a final decree and end this case. However, the 1997-99 period was unusually wet, and even the Colorado State Engineer testified that it would be necessary to "wait and see" how the Replacement Plans performed over more normal hydrology. RT Vol. 231 at 122, 129-30.

The issue is further complicated by potential issues that continue to surface regarding changes to the H-I model. Both states are bound, at least for now, to the use of the model to determine whether or not there are compact shortages at the Stateline. The experts all agree that depletions can be determined only through the use of a model, and Kansas developed the H-I model which Colorado incorporated into its Use Rules. Yet in each of the trial segments in this case (except for damages) there have been serious disagreements among the experts over updating the model, both as to data input and to model coding. To be sure, many of the model changes and data issues have been settled by agreements between the states. But this segment of the trial forecasts a number of

modeling issues that will still need to be settled one way or another in the future applications of the H-I model.

A. Remaining Potential Model Issues.

Evidence adduced during this trial segment indicates that at least these issues will need to be considered in the future use of the H-I model.

1. Phase 2 of the USGS report in regard to measuring the amount of groundwater pumping. RT Vol. 216 at 65-66.
2. Results of Colorado's completed verification program on wells and irrigated acreage. At trial only 426 farm units had been verified out of a total of 725.
3. The commencement of the five-year cycle updating Colorado's irrigated acreage study. RT Vol. 231 at 115; RT Vol. 269 at 61, 66.
4. Proposed changes in the satellite imagery system used by Colorado. RT Vol. 244 at 129-30.
5. Kansas' claim that more data need to be collected on the distribution of surface water. RT Vol. 262 at 82-84.
6. Further investigation of the amount of return flow intercepted by the Amity Canal from Fort Lyon's service area. RT Vol. 236 at 50.
7. Further investigation of the amount of return flow intercepted by the Buffalo Canal from the Amity service area. RT Vol. 264 at 118-22.
8. Any improvements in the calculation of ungaged tributary inflow.

9. Whether any new studies support any adjustments to PET values for salinity, management or otherwise.
10. Proper representation in the model of the various Replacement Plan water sources.
11. Mr. Schroeder's proposed model change discussed in Section VII G on Calculation of Model Demand.
12. Various model calibration issues.

I do not mean to imply that all of these matters will become contentious issues. But these, and still other modeling update requirements, illustrate the kind of matters that require expert agreement or some kind of resolution when compact compliance is dependent upon the results of the H-I model. And all experts agree that continued improvements need to be made to the model to increase its reliability.

B. Model Calibration.

In this last trial segment, Kansas employed two different versions of the H-I model (one for 1997-99 depletions, and one for prospective future compliance), and Colorado used three different versions of the model (its Test Model, Updated Test Model, and Revised Test Model). All of these model versions, by both states, were different from the so-called "approved" version which had been used to determine depletions for 1995-96. Each of these different versions of the H-I model, in the opinion of the expert advocating its use, was sufficiently "calibrated" to determine reasonable estimates of Stateline depletions. Yet all of the results were different. Calibration is achieved by adjusting certain model parameters (WANT factors, canal capacities, diversion reduction factors, etc.) in order to

match predictions as closely as possible to observed data. There is no point, however, in trying to determine which past version of the model is "better" calibrated since the changes called for in this Report will require new calibration efforts. Nor is the Court in a position to direct technically how the model should be calibrated in future updates. Nonetheless, there is one calibration issue which deserves attention.

Mr. Schroeder calibrated his Test Model over alternate periods of time: using the traditional period of 1950-94, and also over the shorter and more recent period of 1970-94. For the area downstream of John Martin Reservoir, he used the still shorter period of 1980-94. Schroeder advocated use of the 1970-94 period because he thought that data from these years were more reliable and more representative of future conditions. Colo. Exh. 1411 at 26, *et seq.* Both Book and Larson, Kansas experts, disagreed and recommended continued use of the 1950-94 period, and possibly even adding years. RT Vol. 243 at 152-53, *et seq.*; RT Vol. 264 at 110; RT Vol. 265 at 66-67. They pointed out that the shorter calibration period used by Mr. Schroeder was not representative of long term hydrology. RT Vol. 243 at 152-53. In particular, the period after 1980 included only one "dry" year. All others ranged between average and very wet. Colo. Exh. 1408, Table 11; RT Vol. 265 at 72. In Mr. Book's opinion, using the water supply that occurred in those 15 years results in higher WANT factors that would cause diversions to be over-predicted over the long term. RT Vol. 264 at 110-11. Certainly as the model is used in the future, the calibration period may change. However, I find that the model should not be recalibrated over the shorter periods of time as recommended by Mr. Schroeder.

C. Kansas Proposal to Appoint a River Master.

Kansas recommends, following the precedent in *Texas v. New Mexico*, 482 U.S. 124, 134, 96 L.Ed.2d 105, 107 S.Ct. 2279 (1987), that the Supreme Court appoint a River Master to "enforce the Court's judgment." Kan. Opening Br. at 83. Kansas first states that the River Master, as in the Pecos River case, "would not act as an arbitrator to resolve any Compact or other issue that might arise between the States in the Arkansas River." *Id.* In its Reply Brief, however, Kansas uses more expansive language, characterizing the role of the Pecos River Master as having "broad powers to exercise judgment," and being able to "resolve any disputes" in the implementation of the judgment. Kan. Reply Br. at 69-70.

Colorado responds that the appointment of a River Master in this case "would be to continue this litigation indefinitely." Colo. Exh. 1412 at 30. Colorado distinguishes *Texas v. New Mexico* on the ground that the Pecos River Master's function "is largely ministerial," and it is not credible to suggest that a master here would not be required to exercise judicial functions. Colo. Reply Br. at 64.

D. Texas v. New Mexico, and the Pecos River Decree.

The Pecos River case does indeed have some remarkable similarities to the present Arkansas River litigation. Both cases involve interstate compacts. Both compacts established commissions to administer the compact, but require unanimous agreement for any commission action. Both compacts, as adjudicated, allocate stream flow on the basis of precompact conditions, rather than designating a specific numerical amount of water for the downstream

state. The Pecos River Compact provides that New Mexico shall not deplete flows at the Texas state line below the quantity that would have been "available to Texas under the 1947 condition." *Texas v. New Mexico*, 462 U.S. 554, 559, 77 L.Ed. 2d 1, 103 S.Ct. 2558 (1983). However, the compact did incorporate an Inflow-Outflow Manual which provided "a workable methodology for translating New Mexico's obligation into quantities of water." *Texas v. New Mexico*, 482 U.S. 124, 129, 96 L.Ed.2d 105, 107 S.Ct. 2279 (1987). Disputes eventually developed over the accuracy of this inflow-outflow methodology, but these issues were settled in the Special Master's 1984 Report. *Texas v. New Mexico*, 467 U.S. 1238, 82 L.Ed.2d 816, 104 S.Ct. 3505 (1984). In that Report, the Master adopted a curve and table which established the relationship between the inflow to the Pecos River in New Mexico, and the required outflow to Texas at the state line. Kan. Opening Br., App. 2 at 13. In later proceedings, New Mexico like Colorado was found to have depleted the stream flow in violation of the compact, beginning in 1950. The total shortfall on the Pecos River amounted to 340,100 acre-feet over the period 1950-83; on the Arkansas depletions are 428,005 acre-feet from 1950 through 1996.

Looking to enforcement of the final decree in *Texas v. New Mexico*, the successor Special Master[19] recommended that the Court enjoin the Pecos River Commission,[20] or a

[19] Charles J. Myers, former Dean of the Stanford Law School.

[20] The earlier Special Master in the Pecos River litigation was the Hon. Jean Breitenstein, a Judge of the Court of Appeals for the Tenth Circuit and "a recognized expert in western water law." *Texas v. New Mexico*, 482 U.S. 124, 127. He recommended that the court use its equitable powers to reform the compact by imposing a tie-breaking

(Continued on following page)

River Master, "to make the calculations provided for in this Decree." Kan. Opening Br., App. 3 at 46, A-2. It should be recognized that his Report recommended that the past shortfall of 340,100 acre-feet be repaid in water over ten years, so it was necessary to account for the past repayment flows as well as flows required for current compliance.[21] The Court chose to approve a River Master "to make the required periodic calculations." *Texas v. New Mexico*, 482 U.S. 124, 134. In so doing, however, the Court noted that the Master had recommended an additional enforcement mechanism because "applying the approved apportionment formula is not entirely mechanical and involves a degree of judgment." *Id.* at 134. There is, of course, no issue in the present case about making up past shortages in water, and distinguishing that water from current flow requirements. Past shortages are to be compensated by money damages. *Kansas v. Colorado*, 533 U.S. 1 (2001).

The most recent 2002 Report of the Pecos River Master was submitted as an exhibit in this case, and is included in this Report in the Appendix as Exhibit 15. It is not clear from this Report, however, how much judgment may be required in preparing the River Master's annual accounting, and indeed whether or not his duties are essentially ministerial as argued by Colorado. The Report

procedure on the Pecos River Commission so that it could act without agreement of the states. The Court found that it did not have authority to modify the compact, which was a law of the United States, having been approved by Congress. *Texas v. New Mexico*, 462 U.S. 554, 563-65.

[21] The states later settled the past shortage issue by stipulating to a money judgment. *Texas v. New Mexico*, 494 U.S. 111, 108 L.Ed.2d 98, 110 S.Ct. 1293 (1990).

contains numerous tables of measured flows at various locations, channel losses, diversions, evaporative losses, precipitation, consumptive use and changes in storage, and concludes that there was an annual shortage of 700 acre-feet, but because of the running account kept since 1987 that New Mexico still retained an "overage" of 9900 acre-feet.

What is evident, however, from the Pecos River Master's Report is that he does not adjudicate the kinds of disputes that may be involved in the future application of the H-I model. Any major disputes on the Arkansas River are likely to occur over the model, and not over the collection of basic data. Such model disputes are not easily determined. One expert in hydrologic modeling, an outside university professor, testified particularly to the complexities of the H-I model, and to the lack of documentation on the assumptions used in the model, and how it operates. RT Vol. 230 at 103-09. He said there is no way to truly understand the model without studying the vast record of this trial, and that it would be difficult for an outsider to run the model simply on the basis of the model code. *Id.* at 111-17.

Finally, it is important to note that the amount of Stateline depletions can be very sensitive to model changes. One exhibit compares the depletions stipulated to for 1950-85 with the results of several later versions of the model applied to that same period. Colo. Exh. 1411, Table 6c at 59. The 1950-85 stipulated figure was 328,500 acre-feet. If the version of the H-I model used to determine depletions for 1986-94 were applied to the 1950-85 period, depletions would have been 474,200 acre-feet. If the Kansas revised H-I model were used, the depletions would increase to 586,400 acre-feet. And if the Colorado Revised

Test Model, calibrated for 1970-94, were used for the1950-85 period, the depletions would be 381,600 acre-feet. *Id.*

E. Court Precedents Regarding Enforcement of Interstate Water Decrees.

There appear to be only two interstate water cases in which the Court has actually appointed a River Master as now requested by Kansas. The most recent case, of course, is *Texas v. New Mexico.* The Amended Decree making the appointment and prescribing the duties of the River Master in that case is found in *Texas v. New Mexico*, 485 U.S. 388, 99 L.Ed.2d 450, 108 S.Ct. 1201 (1988). While recognizing that the Court historically has taken "a distinctly jaundiced view of appointing an agent or functionary to implement our decrees," the Court found this to be "one of those occasions when such a mechanism should be employed." *Texas v. New Mexico*, 482 U.S. 124, 134. The Court noted that the "natural propensity of these two States to disagree . . . cannot be ignored." *Id.* And absent some disinterested authority to make determinations binding on the parties, the Court said that it could anticipate a "series of original actions." *Id.* Nonetheless, the River Master was appointed only "to make the calculations provided for in this decree." *Id.* Those calculations were to be done in accordance with a manual which was admitted into evidence as Texas Exhibit 108. Kansas Exhibit 1104; *Texas v. New Mexico*, 485 U.S. at 388. However, the River Master has the authority to modify the manual. His determinations are subject to review by the Court only upon a showing that they are "clearly erroneous." *Id* at 393. Counsel for Kansas state that this authority allows the River Master to "change the quantitative standard for delivery of water at the stateline [which] is essentially the

same function as performed by the H-I model." Kan. Comments on Draft Fourth Report at 26. However, there is no evidence to this effect, nor that the River Master has ever changed the manual.

The other appointment of a River Master is found in *New Jersey v. New York*, 347 U.S. 995, 98 L.Ed. 1127, 74 S.Ct. 842 (1954). The decree in that case limited diversions by New York from the Delaware River, but then allowed certain stepped up increases in diversions contingent upon the construction of additional storage reservoirs and releases therefrom, and upon the maintenance of prescribed minimum downstream flows. The River Master was charged with the responsibility of making flow calculations and release requirements in order to maintain the applicable minimum rate of flow downstream. *Id.* at 1002-04. A later opinion describes this appointment as a "rare case," and perhaps questionably adds that the River Master was given "only ministerial acts to perform." *Vermont v. New York*, 417 U.S. 270, 275, 41 L.Ed.2d 61, 94 S.Ct. 2248 (1974).

There are interstate water cases in which a request for a River Master or some type of continuing enforcement authority has been denied. *Wisconsin v. Illinois*, 281 U.S. 179, 196, 74 L.Ed. 799, 50 S.Ct. 266 (1930), required a gradual reduction in diversions from Lake Michigan, correlated with the construction of certain defined sewage treatment facilities over the period from 1930 to 1938. A proposal to appoint a "commission to supervise the work" was rejected in favor of requiring the defendant to file periodic reports with the Clerk of the Court on the progress of construction, and allowing the parties to make application to the Court "for such action as may seem to be suitable." *Id.* at 198.

The prayer of the Commonwealth of Pennsylvania for the appointment of a river master was denied without prejudice in *New Jersey v. New York*, 283 U.S. 805, 75 L.Ed. 1425, 51 S.Ct. 562 (1931).

In *Wyoming v. Colorado*, 298 U.S. 573, 80 L.Ed. 1339, 56 S.Ct. 912 (1936), the Court entered an injunction against continuing diversions contrary to a prior decree, but refused to appoint a water master to keep the records. *Id.* at 586. The Court expressed the hope that any problems could be solved by "co-operative efforts," and indeed this was accomplished. *Id.* at 586; *Wyoming v. Colorado*, 309 U.S. 572, 84 L.Ed. 954, 60 S.Ct.765 (1940).

The appointment of a South Lake Master was also rejected in *Vermont v. New York*, 417 U.S. 270. That case involved pollution of Lake Champlain and Ticonderoga Creek. The parties reached a stipulated judgment recommended by the Special Master. The proposed decree made no findings as to liability but required various measures over time to reduce both air and water pollution. International Paper Co. was given a full release for all past damages caused by its discharges into water and air. The proposed South Lake Master was authorized to "resolve matters of controversy" between the parties and his decisions were to be final unless exceptions were taken to the Court. *Id.* at 271. The Court stated that referring to the Court such issues "that the future might bring forth" could materially change the Court's function in interstate contests. *Id.* at 277. "Insofar as we would be supervising the execution of a consent decree, we would be acting more in an arbitral rather than a judicial manner." *Id.* The proposals which the South Lake Master might submit to the Court "might be proposals having no relation to law," or to the Court's Art. III jurisdiction. *Id.*

More often than appointing some kind of river master to supervise the decree in these interstate water cases, the Court has merely retained continuing jurisdiction. *New Jersey v. New York*, 283 U.S. 805; *Nebraska v. Wyoming*, 325 U.S. 589, 89 L.Ed. 1815, 66 S.Ct. 1 (1945); *Arizona v. California*, 376 U.S. 340, 11 L.Ed.2d 757, 84 S.Ct. 755 (1964); *Oklahoma v. New Mexico*, 510 U.S. 126, 126 L.Ed.2d 556, 114 S.Ct. 628 (1993); *Nebraska v. Wyoming*, 534 U.S. 40, 151 L.Ed.2d 356, 122 S.Ct. 420 (2001). The traditional provision for continuing jurisdiction reads:

> "Any of the parties may apply at the foot of this decree for its amendment or for further relief. The Court retains jurisdiction of this suit for the purpose of any order, direction, or modification of the decree, or any supplementary decree, that may at any time be deemed proper in relation to the subject matter in controversy." *Arizona v. California*, 376 U.S. 340, 353.

Sometimes specific issues are identified in the decree as remaining within the Court's continuing jurisdiction. *Nebraska v. Wyoming*, 325 U.S. 589, 671-72. More recent consent decrees require, before applying to invoke the Court's continuing jurisdiction, that the parties certify that they have attempted to negotiate in good faith to resolve the dispute, or that it has been first submitted to a stipulated entity designated to assist in implementing the decree. *Oklahoma v. New Mexico*, 510 U.S. 126, 131; *Nebraska v. Wyoming*, 534 U.S. 40, 55.

In 2001 the States of Wyoming, Nebraska and Colorado stipulated to a modified decree determining rights along the North Platte River. *Nebraska v. Wyoming*, 534 U.S. 40. This represented the second time that the decree had been changed. The original decree, the result of eleven

years of litigation, was entered in 1945. *Nebraska v. Wyoming*, 325 U.S. 589. It was then amended in 1953. *Nebraska v. Wyoming*, 345 U.S. 981, 97 L.Ed. 1394, 73 S.Ct. 1041 (1953). The recent stipulated modification resulted from an enforcement action filed by Nebraska in 1987. As part of the current modified stipulated decree, Wyoming is limited over ten years to the largest total amount of water consumed for irrigation in any ten consecutive year period between 1952 and 1999. *Nebraska v. Wyoming*, 534 U.S. 40, 43. This amount was determined to be 1,280,000 acre-feet. In determining future compliance with this provision, the stipulation establishes a North Platte Decree Committee. After ten years of accounting, the Committee is charged with reviewing both the methodology and the ten consecutive year limit, pursuant to procedures adopted in the stipulation. *Id.* at 43. If Nebraska, Wyoming and the United States are in agreement on a new methodology and limit for determining consumption, the decree will be modified accordingly. If they do not agree, any of the three parties "may seek recourse to the Court to resolve these issues." *Id.* at 44. The North Platte Decree Committee is also charged with other specific responsibilities, and the Court's continuing jurisdiction extends to the "Failure of the North Platte Decree Committee . . . to act upon, resolve or agree on a matter that has been submitted to the . . . Committee." *Id.* at 56. Moreover, "Any dispute related to compliance or administration [of the decree] shall be submitted to and addressed by the North Platte Decree Committee before a party may seek leave of the Court to bring such dispute before the Court." *Id.* at 55.

In May of this year, the Court also approved another stipulated judgment involving the Republican River.

Kansas v. Nebraska, 123 S.Ct. 1898, 2003 U.S. LEXIS 4058. Kansas' motion to file an original action against Nebraska and Colorado to enforce the 1943 Republican River Compact was granted in 1999. The Final Settlement Stipulation, dated December 15, 2002, provided among other matters for the development of a groundwater model to be completed by June 30, 2003, "but if for any reason they have not done so by that date, binding arbitration will resolve the remaining issues necessary for its establishment." Special Master's Second Report at 2. In fact, the groundwater model was completed as required, and the Special Master's Final Report certifying its adoption was filed September 17, 2003. The result of the model's completion will be the dismissal of all claims, counterclaims and cross-complaints. The decree does not provide for continuing jurisdiction.

The Republican River stipulated decree calls for a number of other joint efforts in the future in the confident expectation that the cooperation that brought their case to such a rapid conclusion will continue to exist. An engineering committee is working on a Groundwater Model Users Manual that will provide details related to the use of the model. The model, with annual updates to the appropriate data files, will be used until such time as any changes are approved by the Republican River Compact Administration. The stipulation does, however, provide for dispute resolution. All matters related to compact administration, or to the stipulation, must first be submitted to the Republican River Compact Administration. If the members of the RRCA are not unanimous on a particular matter, it must then be submitted to non-binding arbitration pursuant to procedures prescribed in the Final Settlement Stipulation. There is the option, pursuant to agreement, also to submit

to binding arbitration. Only if these procedures are unsuccessful may a state seek the Court's original jurisdiction. Two of the three members of the Republican River Compact Administration are David L. Pope and Harold D. Simpson, Chief Engineer and State Engineer respectively of Kansas and Colorado, and both important witnesses in the trial of this case.

The emphasis on arbitration is also of interest in this case. Binding arbitration of any future dispute related to the H-I model was proposed during this final trial segment, but was declined by Kansas as a "surrender of an important constitutional right" under Article III, Section 2. Kan. Opening Br. at 85. However, contrasting the Kansas position in this case with its agreement to accept binding arbitration on the groundwater model in the Republican River litigation may not be appropriate. A groundwater model can be far less complex than the H-I stream system model. Moreover, the groundwater model in the Republican River litigation may not play the same decisive compact compliance role that the H-I model holds under Colorado's Use Rules. Nonetheless, the Nebraska-Kansas-Colorado agreement on the Republican River suggests that limited arbitration, perhaps non-binding, might yet be useful for the Arkansas River.

F. Recommendation.

It is my recommendation, in accord with prevailing precedents, that the Court retain continuing jurisdiction in this case for a limited period of time, but that the Kansas request for the appointment of a River Master be denied. None of the interstate water cases supports the appointment of a River Master with authority to decide

the kinds of issues that may still arise with respect to continued compliance with the Arkansas River Compact. Any such issues are not likely to be simply "ministerial" in nature. If a River Master is appointed with sufficiently broad authority to resolve modeling issues, it simply becomes easier to continue this litigation. But it is in the opposite direction that movement is needed. If the Court retains jurisdiction for a limited period of time beyond the recommended ten-year startup period (ending in 2006), there will be a full opportunity to see how Colorado's Use Rules operate under different hydrologic conditions. We already know that 1997-99 was a wet period, that 2001 was average, and that 2002 was extremely dry. If the Use Rules are not administered as Mr. Simpson has indicated, or if the results of the H-I model are still seriously in dispute, either state may apply to the Court for appropriate relief. I would recommend, however, that no such application be accepted unless the dispute has first been taken to the Arkansas River Compact Administration. To be sure, the Compact Administration can act only by unanimous vote. But the climate may be changing. The Compact Administration, under the chairmanship of the United States' representative, may again be seen as the best way to administer the compact and settle issues. After some thirteen years of litigation, the major issues between the states have already been determined or will be determined as a result of this Report. If there are future issues, it is to be hoped that the parties will have a greater appreciation for the Court's oft-stated admonition that litigation of these cases "is obviously a poor alternative to negotiation." *Texas v. New Mexico*, 462 U.S. 554, 567, fn. 13, and 575, citing numerous cases.

SECTION XII

RECOMMENDATIONS

Following my Third Report on damages, and the Court's Opinion thereon (533 U.S. 1, 150 L.Ed.2d 72, 121 S.Ct. 2023 (2001), the case was remanded. A substantial effort was then made to settle the remaining issues through mediation, using the former Attorney General of Montana as the mediator. That effort was unsuccessful, however, and trial resumed on June 24, 2002. These trial proceedings concluded on January 17, 2003 when both states rested their respective cases. This Fourth Report includes my decisions and recommendations on all remaining issues. Accordingly, I recommend:

1. That prejudgment interest be calculated as set forth in my Order dated December 2, 2002, and the final damage award be included in the decree. Appendix Exh. 2.

2. That damages be calculated pursuant to Appendix Exhibits 1 and 3, together with appropriate prejudgment interest, and adjustment for inflation as required.

3. That the Court approve my Order of July 25, 2001 rejecting Kansas' proposed evidence on the Winter Water Storage Program. Appendix Exh. 5.

4. That the Court approve my finding that implementation of Colorado's Use Rules, and the replacement water provided thereunder, brought Colorado into compliance with its obligations under the Arkansas River Compact for the period 1997-99. Section III.

5. That the Court approve my finding that Colorado's Measurement Rules, subject to possible revision following completion of Phase 2 of the USGS study, are adequate to

determine well pumping amounts for use in the H-I model, and that it is not necessary to require installation of totalizing flow meters on all of the wells within the H-I model domain. Section IV.

6. That the results of Colorado's irrigated acreage and well studies, as set forth in Section V of this Fourth Report, shall be used in the H-I model.

7. That in the H-I model, potential evapotranspiration (PET) shall be determined through the use of the Penman-Monteith methodology; that the adjustments recommended by Colorado experts are not sufficiently supported by the evidence and should not be made; that as more information may be developed on conditions in the Arkansas River Valley, adjustments made in accordance with recognized professional procedures may be appropriate. Section VI.

8. That the Court approve my findings and conclusions set forth in Section VII of this Fourth Report in regard changes in the H-I model.

9. That the final amounts of Replacement Plan credits to be applied toward Colorado's compact obligations shall be the amounts determined by the Colorado Water Court, and any appeals therefrom. This is not to say, however, that the Colorado Water Courts are empowered to make a final determination on any matter essential to compact compliance at the Stateline, or that Colorado's reliance on such Water Court actions will necessarily satisfy its compact obligations. Replacement credits not subject to Water Court approval, or calculated outside of the H-I model, shall be determined in accord with Colorado's Use Rules and the implementation procedures described in this trial segment. All replacement credits, no

matter how determined, are subject to the right of Kansas to seek relief under the Court's original jurisdiction. Section VIII.

10. That the Court approve my findings that the Kansas prospective compliance analysis is not sufficient to show that the Colorado Use Rules will not assure future compact compliance, and that Colorado should not be required to place water in the Offset Account in the amount of 15% of its pumping, or that its pumping be limited; that the Colorado evidence is not sufficient to prove that the Use Rules, as they have been applied, will necessarily assure future compliance; that the Use Rules, however, contain provisions that allow for the increase of replacement water for the benefit of Kansas, if that should be necessary; and that the actual implementation of the Use Rules over a longer period of time is needed to determine whether Colorado will continue to meet its compact obligations. Section IX.

11. That the Court approve my conclusions found in Section X of this Report accepting Colorado's proposal to use the results of the H-I model over a ten-year period to measure compact compliance, and to make up any depletions as testified to by the Colorado State Engineer.

12. That the Court deny the Kansas request to appoint a River Master to administer the final decree in this case, but that it retain jurisdiction for a limited period of time as recommended in Section XI of this Report.

13. That the case be remanded for the preparation of a final decree in accord with the prior Opinions of the

Court in this case, and with the Recommendations made in this Report, or as the Court may otherwise determine.

Respectfully Submitted,

ARTHUR L. LITTLEWORTH
Special Master

October 16, 2003

APPENDIX

Exhibit 1:

Letters dated August 7, 2003, from Counsel agreeing upon calculations of damages for compact violations in years 1950-94.

MONTGOMERY & ANDREWS
PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

[Names and Addresses Omitted in Printing]

August 7, 2003

VIA TELECOPY & U.S. MAIL

The Honorable Arthur L. Littleworth
Special Master
Best Best & Krieger
400 Mission Square
3750 University Avenue, 3rd Floor
Riverside, California 92501

RE: *Kansas v. Colorado*, No. 105, Original U.S. Supreme Court

Dear Mr. Littleworth:

Following our telephone conference with you on July 31, the States have conferred regarding what could be identified as being agreed with respect to the calculation of damages. The results are the following. Copies of the tables referred to are attached.

Pursuant to your determinations in the Third Report, the States agreed on the calculation of nominal damages in the years 1950-1998 resulting from Compact violations in the years 1950-1994. The annual nominal values are shown in Table D4 (col. 12) and Table D8 (sum of cols. 2-4) of Exhibit 1 to Kansas' Brief on Unresolved Damages Issues for the Period 1950-1994 ("Table D8") and in Table F of Exhibit C to Colorado's Motion to Determine the Amount of Damages in Prejudgment Interest for the 1950-94 Period (col. 5) ("Table F"). The sum of the annual

nominal values for 1950-1998 is $7,059,595, as shown at the bottom of Table F, col. 5.

You inquired about a column in Table F labeled "Damages Adjusted for Inflation," which has a total of $18,391,014. This is not a value that is claimed to represent damages by either Colorado or Kansas. The States agree that it is the sum of the nominal damages in 1998 dollars adjusted for inflation, but is not a value that includes the investment component of prejudgment interest in accordance with the Supreme Court's 2001 Opinion, as calculated by either State.

You also inquired during our conference call whether the values that are the subject of your December 2, 2002 Order ("Order Values") included damages that are the subject of the States' Stipulation re Amount of Damages for 1995-96 and the Rate of Prejudgment Interest on Those Damages ("Stipulated Values"). The answer is that the Order Values do not include the Stipulated Values and are therefore totally separate. The Order Values are based on the damages resulting from Compact violations in the years 1950-1994. The Stipulated Values are based on the damages resulting from Compact violations in the years 1995-1996.

Sincerely yours,

/s/ John B. Draper
John B. Draper

JBD:dlo

cc: David W. Robbins, Esq.
David Davies, Esq.
Leland E. Rolfs, Esq.

Table D4. Summary of Kansas damages from usable depletions to stateline flow, expressed in current year dollars

	Replacement Groundwater (Case1)			Reduced GW Levels (Case 2)			Lost Crop Production (Case 3)			Total Economic Damages		
Year	Direct Gain (Loss) 1	Indirect Gain (Loss) 2	Total Gain (Loss) 3	Direct Gain (Loss) 4	Indirect Gain (Loss) 5	Total Gain (Loss) 6	Direct Gain (Loss) 7	Indirect Gain (Loss) 8	Total Gain (Loss) 9	Direct Gain (Loss) 10	Indirect Gain (Loss) 11	Total Gain (Loss) 12
1950	(88)	9	(79)	(3)	0	(3)	(2,060)	(248)	(2,308)	(2,151)	(239)	(2,390)
1951	(543)	55	(487)	(25)	3	(22)	(14,414)	(1,719)	(16,133)	(14,982)	(1,661)	(16,643)
1952	(490)	50	(440)	(69)	9	(61)	(12,128)	(1,426)	(13,554)	(12,687)	(1,388)	(14,055)
1953	(1,213)	124	(1,089)	(82)	10	(72)	(23,767)	(2,885)	(26,652)	(25,062)	(2,751)	(27,813)
1954	(2,706)	277	(2,429)	(397)	49	(348)	(47,971)	(5,841)	(53,812)	(51,074)	(5,515)	(56,589)
1955	(5,819)	599	(5,220)	(702)	87	(614)	(81,883)	(10,306)	(92,189)	(88,404)	(9,820)	(98,024)
1956	(4,658)	444	(4,214)	(760)	93	(667)	(92,238)	(11,318)	(103,557)	(97,657)	(10,781)	(108,438)
1957	(1,787)	176	(1,611)	(652)	86	(566)	(31,253)	(4,042)	(35,295)	(33,592)	(3,800)	(37,392)
1958	(2,232)	226	(2,006)	(628)	76	(552)	(34,893)	(4,581)	(39,275)	(37,553)	(4,280)	(41,832)
1959	(454)	48	(405)	(466)	56	(410)	(6,772)	(898)	(7,671)	(7,692)	(794)	(8,486)
1960	(7,513)	721	(6,792)	(1,056)	130	(927)	(82,598)	(11,312)	(93,910)	(91,169)	(10,460)	(101,630)
1961	(5,594)	539	(5,055)	(959)	118	(841)	(62,412)	(8,373)	(70,786)	(68,965)	(7,718)	(76,682)
1962	(3,173)	307	(2,866)	(1,229)	151	(1,078)	(36,638)	(4,839)	(41,476)	(41,039)	(4,380)	(45,420)
1963	(6,849)	656	(6,193)	(1,586)	198	(1,388)	(68,635)	(9,185)	(77,700)	(76,970)	(8,311)	(85,281)
1964	(10,533)	984	(9,549)	(3,248)	373	(2,875)	(87,589)	(11,805)	(99,174)	(101,350)	(10,248)	(111,598)
1965	(19,489)	1,886	(17,603)	(1,667)	196	(1,471)	(82,109)	(10,825)	(92,934)	(103,265)	(8,743)	(112,008)
1966	(1,976)	209	(1,766)	(1,670)	193	(1,477)	(28,532)	(3,093)	(31,625)	(32,178)	(2,890)	(34,868)
1967	(1,092)	132	(960)	(1,287)	146	(1,141)	(20,553)	(2,179)	(22,732)	(22,932)	(1,901)	(24,833)
1968	(15,618)	1,578	(14,041)	(2,581)	322	(2,259)	(109,989)	(15,721)	(125,710)	(128,189)	(13,821)	(142,010)
1969	(8,413)	885	(7,529)	(2,003)	257	(1,746)	(48,218)	(6,606)	(54,824)	(58,634)	(5,465)	(64,099)
1970	(8,061)	828	(7,233)	(2,797)	354	(2,443)	(64,547)	(8,993)	(73,540)	(75,405)	(7,811)	(83,216)
1971	(8,239)	835	(7,404)	(2,381)	298	(2,083)	(71,047)	(10,057)	(81,104)	(81,667)	(8,924)	(90,591)
1972	(11,526)	1,116	(10,411)	(3,435)	433	(3,003)	(117,934)	(15,697)	(133,631)	(132,896)	(14,149)	(147,045)
1973	(7,821)	787	(7,035)	(6,187)	772	(5,414)	(113,507)	(13,694)	(127,201)	(127,515)	(12,135)	(139,651)
1974	(12,491)	1,279	(11,211)	(9,390)	1,179	(8,211)	(167,370)	(20,809)	(188,179)	(189,251)	(18,351)	(207,602)
1975	(22,396)	2,357	(20,041)	(10,442)	1,330	(9,112)	(204,730)	(27,501)	(232,231)	(237,571)	(23,813)	(261,384)
1976	(44,914)	4,730	(40,183)	(16,222)	2,083	(14,139)	(287,120)	(42,257)	(329,377)	(348,256)	(35,444)	(383,699)
1977	(38,652)	4,100	(34,552)	(14,082)	1,785	(12,297)	(210,757)	(32,091)	(242,848)	(263,491)	(26,207)	(289,698)
1978	(63,661)	6,785	(56,877)	(27,838)	3,480	(24,158)	(323,375)	(47,393)	(370,768)	(414,874)	(37,129)	(451,803)
1979	(65,435)	7,005	(58,430)	(30,889)	3,710	(27,179)	(317,214)	(46,838)	(364,052)	(413,538)	(38,123)	(449,661)
1980	(16,642)	1,695	(14,946)	(37,140)	4,149	(32,991)	(84,048)	(11,968)	(96,014)	(137,828)	(8,123)	(143,951)
1981	(33,024)	3,494	(29,530)	(42,707)	4,939	(37,768)	(131,223)	(19,069)	(150,293)	(206,954)	(10,837)	(217,591)
1982	(63,363)	6,674	(56,689)	(42,228)	4,917	(37,311)	(206,000)	(31,545)	(239,545)	(313,591)	(19,954)	(333,545)
1983	(12,709)	1,458	(11,251)	(45,678)	5,468	(40,410)	(38,437)	(5,675)	(44,112)	(97,025)	1,251	(95,774)
1984	(15,814)	1,934	(13,880)	(48,112)	5,807	(42,305)	(38,035)	(5,502)	(43,537)	(101,961)	2,240	(99,721)
1985	0	0	0	(62,179)	7,496	(54,684)	(7,859)	(820)	(8,678)	(70,038)	6,676	(63,362)
1986	(51,729)	6,055	(45,673)	(61,206)	7,369	(53,837)	(62,624)	(11,478)	(74,102)	(175,558)	1,946	(173,613)
1987	(7,247)	1,117	(6,130)	(58,818)	8,238	(50,583)	(22,540)	(2,794)	(25,334)	(88,605)	8,559	(82,046)
1988	(35,379)	4,917	(30,462)	(83,248)	11,916	(71,332)	(55,205)	(9,180)	(64,386)	(173,833)	7,853	(166,180)
1989	(46,021)	6,387	(39,633)	(68,987)	10,065	(58,922)	(66,884)	(11,837)	(78,721)	(181,892)	4,615	(177,277)
1990	(94,345)	13,064	(81,281)	(79,351)	11,542	(67,809)	(102,268)	(21,390)	(123,658)	(275,964)	3,216	(272,748)
1991	(123,436)	16,841	(106,597)	(94,503)	13,774	(80,729)	(142,881)	(29,389)	(172,070)	(360,822)	1,227	(359,396)
1992	(130,232)	17,754	(112,478)	(64,358)	9,533	(54,826)	(136,702)	(30,330)	(169,031)	(333,292)	(3,043)	(336,335)
1993	(62,585)	8,459	(54,126)	(63,969)	9,463	(54,506)	(78,120)	(15,367)	(93,487)	(204,674)	2,556	(202,118)
1994	(107,516)	14,554	(92,963)	(98,279)	14,374	(83,905)	(109,999)	(23,069)	(133,069)	(315,794)	5,856	(309,938)
1995	0	0	0	(94,024)	13,624	(80,400)	0	0	0	(94,024)	13,624	(80,400)
1996	0	0	0	(100,349)	14,530	(85,818)	0	0	0	(100,349)	14,530	(85,818)
1997	0	0	0	(89,581)	13,140	(76,440)	0	0	0	(89,581)	13,140	(76,440)
1998	0	0	0	(80,826)	11,922	(68,903)	0	0	0	(80,826)	11,922	(68,903)
Future	0	0	0	(1,998,122)	294,738	(1,703,384)	0	0	0	(1,998,122)	294,738	(1,703,384)

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Table D8. Summary of Kansas damages from useable depletions to stateline flow according to Court ruling

	Annual Current Dollar Damages			Annual Damages (1950-84)-a			Annual Damages (1985-98)-b		
	Direct Impacts		Indirect	1985 Dollars			1998 Net Present Value		
Year	Farm	State	Impact	Farm	State	Indirect	Farm	State	Indirect
1950	2,105	46	239	9,397	205	1,067			
1951	14,662	321	1,661	60,444	1,322	6,846			
1952	12,416	271	1,368	50,223	1,096	5,533			
1953	24,524	538	2,751	98,464	2,158	11,044			
1954	49,985	1,089	5,515	199,939	4,358	22,059			
1955	86,519	1,885	9,620	347,366	7,570	38,622			
1956	95,563	2,094	10,781	378,036	8,284	42,649			
1957	32,837	755	3,800	125,737	2,892	14,551			
1958	36,486	1,067	4,280	135,843	3,972	15,934			
1959	7,465	227	794	27,603	840	2,935			
1960	88,643	2,526	10,460	322,229	9,183	38,025			
1961	67,036	1,930	7,716	241,238	6,944	27,768			
1962	39,885	1,154	4,380	142,108	4,111	15,607			
1963	74,855	2,115	8,311	263,217	7,436	29,225			
1964	98,681	2,669	10,248	342,518	9,265	35,570			
1965	99,322	3,943	8,743	339,272	13,468	29,865			
1966	30,866	1,311	2,690	102,507	4,355	8,934			
1967	21,935	998	1,901	70,664	3,214	6,124			
1968	123,210	4,978	13,821	380,961	15,393	42,734			
1969	56,348	2,285	5,465	165,207	6,701	16,022			
1970	72,358	3,047	7,811	200,663	8,451	21,662			
1971	78,368	3,299	8,924	208,207	8,765	23,710			
1972	127,531	5,364	14,149	328,286	13,809	36,422			
1973	122,367	5,148	12,135	296,547	12,477	29,408			
1974	161,612	7,038	18,351	396,379	16,671	40,052			
1975	227,981	9,590	23,813	455,963	19,179	47,626			
1976	334,203	14,052	35,444	631,990	26,574	67,025			
1977	252,857	10,634	26,207	448,968	18,881	46,532			
1978	397,961	16,714	37,129	656,758	27,582	61,274			
1979	396,870	16,668	36,123	588,199	24,703	53,538			
1980	132,427	5,401	6,123	172,926	7,053	7,995			
1981	198,843	8,111	10,637	235,374	9,601	12,591			
1982	301,301	12,290	19,954	335,959	13,704	22,249			
1983	93,151	3,873	(1,251)	100,633	4,185	(1,352)			
1984	97,890	4,071	(2,240)	101,376	4,218	(2,320)			
1985	67,244	2,794	(6,676)				225,555	6,084	(18,831)
1986	168,656	6,802	(1,945)				505,401	13,802	(4,991)
1987	84,700	3,906	(6,559)				227,687	7,281	(15,513)
1988	166,112	7,721	(7,653)				403,108	13,581	(16,445)
1989	174,589	7,303	(4,615)				382,596	12,044	(9,047)
1990	265,332	10,632	(3,216)				523,015	16,100	(5,791)
1991	348,724	13,898	(1,227)				617,171	19,389	(2,026)
1992	319,630	13,662	3,043				517,447	17,807	4,644
1993	196,337	8,337	(2,556)				292,524	10,385	(3,615)
1994	302,780	13,014	(5,858)				415,994	15,699	(7,744)
1995	90,387	3,637	(13,624)				114,675	4,246	(16,607)
1996	96,467	3,882	(14,530)				112,853	4,313	(16,594)
1997	86,116	3,465	(13,140)				93,180	3,650	(14,001)
1998	77,699	3,127	(11,922)				77,699	3,127	(11,922)
	Sum 1950-84 in 1985'$			8,961,202	328,620	877,527			
	Net Present Value 1998'$			30,058,561	715,536	2,475,328	4,508,887	147,517	(138,484)
						Sum NPV 1998'$			37,767,346
						Future Damages 1998'$			1,703,384
						TOTAL 1998'$			39,470,730
	Net Present Value 2002'$ - c			40,415,417	877,724	3,234,016	6,062,450	180,954	(180,929)
						Sum NPV 2002'$			50,589,632
						Future Damages 2002'$			2,290,295
						TOTAL 2002'$			52,879,927

a: Values calculated using CPI shown in Table D5.
b: Values calculated using compound factors shown in Table D5.
c: Values calculated using compound factors shown in Table D5A.
NOTE: Dollar values for 2002 represent a date of January 1, 2002.
Settlement after this date will require appropriate adjustment in interest charges.
JOHNS Sacimp Options.wb2 : Table D8 cell AS122 (August 2002)

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Table F. Colorado's estimate of money damages due to stateline depletions from 1950 through 1984, expressed in both 1998 and 2002 dollars, including adjustments for inflation and prejudgment interest

Year	Annual Current Dollar Damages: Direct Impacts: Farm	Direct Impacts: State	Indirect Impact	Sum of Nominal Damages	CPI Factors For 1998 = 1.00	Damages Adjusted For Inflation	Prejudgment Interest Added	Total Estimated Damages
1950	2,105	46	239	2,390	6.7751	16,190		16,190
1951	14,662	321	1,661	16,643	6.2787	104,497		104,497
1952	12,416	271	1,368	14,055	6.1445	86,361		86,361
1953	24,524	538	2,751	27,813	6.0984	169,615		169,615
1954	49,985	1,089	5,515	56,589	6.0681	343,390		343,390
1955	86,519	1,885	9,620	98,024	6.0908	597,046		597,046
1956	95,563	2,094	10,781	108,438	6.0010	650,742		650,742
1957	32,837	755	3,800	37,392	5.7946	216,672		216,672
1958	36,486	1,067	4,280	41,832	5.6401	235,940		235,940
1959	7,465	227	794	8,486	5.6014	47,534		47,534
1960	88,643	2,526	10,460	101,630	5.5068	559,649		559,649
1961	67,036	1,930	7,716	76,682	5.4515	418,030		418,030
1962	39,885	1,154	4,380	45,420	5.3974	245,145		245,145
1963	74,855	2,115	8,311	85,281	5.3268	454,276		454,276
1964	98,681	2,669	10,248	111,598	5.2581	586,789		586,789
1965	99,322	3,943	8,743	112,008	5.1746	579,596		579,596
1966	30,866	1,311	2,690	34,868	5.0309	175,417		175,417
1967	21,935	996	1,901	24,833	4.8802	121,191		121,191
1968	123,210	4,978	13,821	142,010	4.6839	665,160		665,160
1969	56,348	2,285	5,465	64,099	4.4414	284,688		284,688
1970	72,358	3,047	7,811	83,216	4.2010	349,595		349,595
1971	78,368	3,299	8,924	90,591	4.0247	364,601		364,601
1972	127,531	5,364	14,149	147,045	3.8995	573,404		573,404
1973	122,367	5,148	12,135	139,651	3.6712	512,681		512,681
1974	181,612	7,638	18,351	207,602	3.3063	686,391		686,391
1975	227,981	9,590	23,813	261,384	3.0297	791,925		791,925
1976	334,203	14,052	35,444	383,699	2.8647	1,099,173		1,099,173
1977	252,857	10,634	26,207	289,698	2.6898	779,220		779,220
1978	397,961	16,714	37,129	451,803	2.5000	1,129,508		1,129,508
1979	396,870	16,668	36,123	449,661	2.2452	1,009,570		1,009,570
1980	132,427	5,401	6,123	143,951	1.9782	284,757		284,757
1981	196,843	8,111	10,637	217,591	1.7932	390,180		390,180
1982	301,301	12,290	19,954	333,545	1.6891	563,398		563,398
1983	93,151	3,873	(1,251)	95,774	1.6365	156,738		156,738
1984	97,890	4,071	(2,240)	99,721	1.5688	156,445		156,445
1985	67,244	2,794	(6,676)	63,362	1.5149	95,985	116,823	212,808
1986	168,656	6,902	(1,945)	173,613	1.4872	258,202	256,011	514,213
1987	84,700	3,906	(6,559)	82,046	1.4349	117,725	101,730	219,455
1988	166,112	7,721	(7,653)	166,180	1.3779	228,972	171,272	400,244
1989	174,589	7,303	(4,615)	177,277	1.3145	233,034	152,559	385,593
1990	265,332	10,632	(3,216)	272,748	1.2471	340,152	193,172	533,325
1991	346,724	13,898	(1,227)	359,396	1.1968	430,114	204,430	634,544
1992	319,630	13,662	3,043	336,335	1.1618	390,753	149,146	539,898
1993	196,337	8,337	(2,556)	202,118	1.1280	227,995	71,298	299,293
1994	302,780	13,014	(5,858)	309,936	1.0999	340,888	83,061	423,949
1995	90,387	3,637	(13,624)	80,400	1.0696	85,992	16,322	102,314
1996	96,467	3,882	(14,530)	85,818	1.0389	89,155	11,417	100,572
1997	86,116	3,465	(13,140)	76,440	1.0156	77,631	5,178	82,809
1998	77,699	3,127	(11,922)	68,903	1.0000	68,903	0	68,903
Sums	6,521,837	260,385	277,373	7,059,595		18,391,014	1,532,419	19,923,433

Adjusting the sum of estimated damages to 2002 dollars results in the following estimate of damages:	26,666,048
Including the estimated future damages, also expressed in 2002 dollars, adds the following amount:	2,332,318
The sum of estimated historical and future damages, expressed in 2002 dollars is the following amount:	28,998,366

This table appears in Johnsse8.wb2, Page Table D6, Cell BY 120. It was created on July 21, 2002 and is on the may2002 subdirectory.

HILL & ROBBINS, P.C.
ATTORNEYS AT LAW
100 BLAKE STREET BUILDING
1441 EIGHTEENTH STREET
DENVER, COLORADO 80202-5932

[Names and Addresses Omitted In Printing]

August 7, 2003

VIA TELECOPY AND U.S. MAIL

Special Master Arthur L. Littleworth
Best, Best & Krieger
400 Mission Square Building
3750 University Avenue, 3rd Floor
Riverside, CA 92501

Re: ***Kansas v. Colorado*, No. 105, Original U.S. Supreme Court**

Dear Mr. Littleworth:

We concur with Mr. Draper's letter of today's date.

Very truly yours,

/s/ David W. Robbins
David W. Robbins

DWR/rmm

cc: John B. Draper, Esq.
Carol Angel

APPENDIX

Exhibit 2:

Order of Special Master dated December 2, 2002, regarding prejudgment interest.

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant, UNITED STATES OF AMERICA, Intervenor	)	No. 105 Original

ORDER RE APPLICATION OF PREJUDGMENT INTEREST FOR THE 1950-94 PERIOD

(Filed Dec. 2, 2002)

INTRODUCTION

As part of the trial segment beginning June 24, 2002 which concerns the issues of possible Stateline depletions for the years 1997-99 and future Compact compliance, the states were asked to confer on the modifications to the calculation of damages for 1950-94 as required by the Supreme Court's Opinion of June 11, 2001. In my Third Report, I had recommended approval of the analyses used by Kansas experts to determine such damages, but had not accepted all of the data on which they relied. Instead, in certain instances I recommended that data compiled by Colorado experts be used. My recommendations in this regard were approved by the Court, requiring a recalculation of what the parties refer to as "nominal damages." These are the actual dollar values of the various damage components at the time a loss occurred. Such nominal damages did not include any

adjustment either for inflation, or for prejudgment interest representing lost investment opportunities.

As a result of these out of Court efforts, the states have agreed upon the amount of nominal damages for the years 1950-94. The approved methodology and data for the recalculation of nominal damages appears in my Third Report in Sections V, VI, VII, VIII, IX and X, and are summarized in the Colorado Motion on page 3. The states have also agreed upon the adjustments to nominal damages required for inflation, calculated in 2002 dollars. Colorado has always acknowledged that nominal damages should be adjusted for inflation, and the states are now in agreement upon the specific rates for such adjustment.

In their negotiations, however, the states disagreed over the application of the Supreme Court's Opinion with respect to prejudgment interest. I asked the states to brief this remaining issue, and as part of the briefing process, Colorado filed a specific Motion reflecting its position. The Kansas briefs may be accepted as its response, and they set forth Kansas' position on the prejudgment interest issue.

The Colorado Motion seeks a determination that damages for the 1950-94 period, adjusted for inflation, are $28,998,366 in 2002 dollars. The corresponding Kansas calculation is $52,879,927. The difference depends upon whether or not prejudgment interest accrues after 1985 on the damages that occurred during the period 1950-85. There is no dispute over the fact that the Supreme Court's Opinion precludes prejudgment interest (apart from an inflation adjustment) for damages that occurred before Kansas filed this action, i.e., at the end of 1985.

SPECIAL MASTER'S THIRD REPORT

In the trial proceedings leading up to my Third Report, the issues surrounding prejudgment interest were extensively argued: i.e., whether prejudgment interest was allowable at all as a matter of law; if so, whether such an award was dependent upon a balancing of the equities; whether any award should run from commencement of the first Compact violation in 1950, or at some later date; and what should be the rate of any prejudgment interest. It was the Colorado position that the unliquidated nature of the damages precluded any award of prejudgment interest, as a matter of law. I found against Colorado on this issue, and the Supreme Court overruled Colorado's exception. 533 U.S. 1 at 12. Kansas, on the other hand, argued that prejudgment interest is not an added remedy, but is simply part of providing full compensation to an injured party, and is required by recent case law as well as the economic principle of the "time value of money." It was the Kansas position that prejudgment interest, including a component for inflation and lost investment opportunities, should be awarded as a matter of course on the Stateline shortages beginning in 1950. I also rejected the Kansas view, finding that prejudgment interest should not be awarded according to any rigid theory of compensation for money withheld, but rather should be governed by considerations of fairness and a balancing of the equities. Kansas' exception to this finding was also overruled by the Court. 533 U.S. 1 at 16.

In my Third Report, I did not wholly accept the position of either state. I found that the law now permits prejudgment interest to be included in any damage award for violation of an interstate water compact, but that the amount is to be governed by "considerations of fairness,"

and the remedy taken as a whole must be "fair and equitable." *Jackson County v. United States,* 308 U.S. 343, 352, 84 L.Ed. 313, 60 S.Ct. 285 (1939); *Texas v. New Mexico,* 482 U.S. 124, 134, 96 L.Ed.2d 105, 107 S.Ct. 2279 (1987). For reasons set forth in my Third Report, I concluded that prejudgment interest should be included in this case at the rates proposed by Kansas, but only from 1969 when Colorado knew or should have known of its Compact violations. I rejected the notion of requiring full prejudgment interest rates during 1950-68 when neither state saw any wrongdoing, or thought that Compact violations were occurring. Only with hindsight and sophisticated computer modeling do we now know that Stateline depletions occurred during those early years. Specifically, I recommended the inclusion of prejudgment interest, "but only from 1969 to the date of judgment," and that actual damages for 1950-68 should be adjusted for inflation (which Colorado had always proposed), "but should not bear compound interest reflecting the loss of use of those monies." Third Report at 107.

Prejudgment interest was perhaps the principal issue in the Supreme Court's consideration of my Third Report. Although its Opinion on this issue was not unanimous, the Court agreed that damages should include an award of prejudgment interest, but that the equities did not support interest from the date of the first violation of the Compact in 1950, "but rather favor an award beginning at a later date." 553 U.S. 1 at 14. Considering such "later date," the Court went on to state:

> "Specifically, Colorado suggests that prejudgment interest should begin to accrue in 1985 rather than 1969. The choice between the two dates is surely debatable; it is a matter over which

> reasonable people can – and do – disagree. After examining the equities for ourselves, however, a majority of the Court has decided that the later date is the more appropriate." 533 U.S. 1 at 15.

The Court therefore overruled the states' objections, except that Colorado's objection was sustained "insofar as it challenges the award of interest for the years prior to 1985." 533 U.S. 1 at 16.

ARGUMENTS OF THE STATES

First, it may be helpful to outline the matters on which the states agree. For damages caused by depletions occurring *after* 1985 when the action was filed, they agree that prejudgment interest is appropriate, at rates reflecting both inflation and lost investment opportunities. Moreover, they agree upon the specific amounts of such damages through 1994. They further acknowledge that under the Supreme Court decision, damages occurring before the action was filed, i.e., for the 1950-85 period, may not bear interest that reflects lost investment opportunities. This is a separate matter from an adjustment for inflation to which Colorado has always agreed. Remaining at issue, however, is the question of how the total amount of damages for the early 1950-85 period (adjusted for inflation) should be treated after 1985, and until entry of Judgment. Kansas maintains that such total, after 1985, should begin to bear full prejudgment interest, at rates including both inflation and lost investment opportunities. Colorado, while acknowledging the need to adjust for inflation, argues that such damages are exempt from any other prejudgment interest. Approximately 24 million dollars is dependent upon this decision. In 2002 dollars, the Kansas approach puts total damages for the 1950-94

period at $52,879,927. Colorado's analysis leads to a total of $28,998,366.

It is Kansas' position that the Supreme Court's decision of June 11, 2001 "left open" the question of whether prejudgment interest should begin to accrue on *all* damages existing as of 1985, or only on the "additional damages" occurring after filing the suit in 1985. Kansas Brief at 4. Colorado, on the other hand, states that the only issue is whether the Supreme Court "intended to overrule" the Special Master's recommendation, citing from the Third Report:

> "I thus recommend that actual damages for the period 1950-68 should be adjusted for inflation, but should not bear compound interest reflecting the loss of use of those monies." Colorado Brief at 2, 5, 9.

Colorado argues that the Supreme Court simply changed the Special Master's 1969 date to 1985. Colorado Brief at 10.

In connection with the argument before the Supreme Court on my Third Report, I directed the states to calculate what the total amount of damages would have been if the Court were to have accepted my recommendations in their entirety. The states were able to agree that the total amount of damages for the period 1950-94, adjusted to 1998 dollars and calculated on the basis of the Third Report, came to approximately 38 million dollars, and this information was conveyed to the Court. The states received no direction on how to calculate these damages. The meaning of the Third Report in this respect lay with the two states.

It is significant, therefore, that in reaching the 38 million dollar figure, the states did not calculate prejudgment interest in the manner that Kansas now suggests. That is, the states did not take the pre-1969 damages, and then subject that total to prejudgment interest for 1969 and all the years following. Rather, they treated damages for the period 1950-68 as being completely exempt from any interest reflecting lost investment opportunities. That component of prejudgment interest was added by the states only to those damages occurring in 1969 and afterwards. In essence, the states followed the methodology now urged by Colorado, except that they were dealing with 1969 instead of 1985.

Kansas does not dispute the fact that this was the construction given to my Third Report when the states advised the Court of the 38 million dollar figure. However, Kansas argues that the determinative question at present is not how the states interpreted the Third Report, but rather "the basis on which the Supreme Court intended to award prejudgment interest upon its review of the Third Report." November 22, 2002 letter. They say that the "only result consistent with the Court's rationale is an award of interest that takes into account Kansas' lost opportunity to invest its damages over the period from 1985 to the date of judgment." *Id.* I cannot agree.

Initially, the Justices appear to have held three separate views concerning prejudgment interest. Four members of the Court agreed with my view "that interest should run from the time when Colorado knew or should have known it was violating the Compact," that is, from 1969. 533 U.S. 1 at 15, fn. 5. Under these circumstances, the states had advised the Court that damages would total approximately 38 million dollars. Three Justices, however,

"would not allow any prejudgment interest." *Id.* It was their view that the state of the law in 1949 was insufficiently evolved "for Colorado to have had notice that the courts might award prejudgment interest if it violated its obligations under the Compact." 533 U.S. 1 at 11, fn. 4. Finally, two members of the Court were of the opinion that "prejudgment interest should run from the date of the filing of the complaint," i.e., from 1985. 533 U.S. 1 at 15, fn. 5. Clearly there was no sentiment on the Court to increase damages, including prejudgment interest, over the amount recommended in my Third Report. Indeed, the final action of the Court was to reduce my recommended award. The Court stated that "[I]n order to produce a majority for a judgment" the four Justices who agreed with the Third Report voted to endorse the Colorado position, explaining:

> "Given the uncertainty over the scope of the damages that prevailed during the period between 1968 and 1985 and the fact that it was uniquely in Kansas' power to begin the process by which those damages would be quantified, Colorado's request that we deny prejudgment interest for that period is reasonable." 533 U.S. 1 at 15, 16.

Yet the theory of calculating prejudgment interest that is now proposed by Kansas would move the award in the opposite direction. I believe the Court intended to exempt all damages occurring before the suit was filed from any prejudgment interest (not including an adjustment for inflation.) Prejudgment interest should apply *only* to those damages occurring after filing suit, i.e., after 1985.

While the Court has ruled that interest should begin to accrue in 1985, Kansas argues the Court did not identify "the principal amount on which interest should accrue." Kan. Brief at 10, also at 2, 4. That principal amount, according to Kansas, should be the nominal damages occurring from 1950 through 1984, which would then accrue interest "compounded over the period 1985 through 2001 [or to date of judgment] at interest rates accounting for inflation and lost investment opportunities." Kan. Brief at 3. Kansas cites a number of cases, arguing that these precedents "leave no doubt" that its approach "is the correct one." Kan. Brief at 4. However, these cases merely reflect general law and do not help with the Court's meaning in this case. The Kansas approach presupposes that the Supreme Court's intent cannot be ascertained from its Opinion, and with this fundamental assumption I cannot agree. Looking to the Court as a whole, the plain direction was to limit the application of prejudgment interest.

I find that the Colorado position properly applies the Court's intent, and accordingly, the Colorado Motion is hereby granted.

DATED: December 2, 2002

/s/ Arthur L. Littleworth
ARTHUR L. LITTLEWORTH
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business

address is Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502.

I am readily familiar with Best, Best & Krieger's practice for collecting and processing correspondence for mailing with the United States Postal Service. Under that practice, all correspondence is deposited with the United States Postal Service the same day it is collected and processed in the ordinary course of business.

On December 2, 2002, I served the within **ORDER RE APPLICATION OF PREJUDGMENT INTEREST FOR THE 1950-94 PERIOD** by placing a copy of the document in a separate envelope for each addressee named below and addressed to each such addressee as follows:

John B. Draper, Esq.
Montgomery & Andrews
325 Paseo de Peralta
P.O. Box 2307
Santa Fe, New Mexico 87504-2307

David W. Robbins, Esq.
Hill & Robbins
100 Blake Street Building
1441 Eighteenth Street
Denver, Colorado 80202

Theodore B. Olson
Solicitor General
United States Department of Justice
Main Building, Room 5259
950 Pennsylvania Avenue NW
Washington D.C. 20530

James J. DuBois, Esq.
U.S. Department of Justice
General Litigation Section
999 18th Street, Suite 945
Denver, Colorado 80202

On December 2, 2002, at the office of Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502, I sealed and placed each envelope for collection and deposit by Best, Best & Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on December 2, 2002, at Riverside, California.

/s/ Sandra L. Simmons
Sandra L. Simmons

APPENDIX

Exhibit 3:

Stipulation filed July 14, 2003, re Amount of Damages for 1995-96 and the Rate of Prejudgment Interest on Those Damages.

No. 105, Original

In The
Supreme Court of the United States

STATE OF KANSAS,
Plaintiff,
v.
STATE OF COLORADO,
Defendant,
and
UNITED STATES OF AMERICA,
Intervenor.

STIPULATION RE AMOUNT OF DAMAGES FOR 1995-96 AND THE RATE OF PREJUDGMENT INTEREST ON THOSE DAMAGES

(Filed Jul 14, 2003)

This Stipulation is entered into this 11th day of July, 2003, by the State of Kansas (hereinafter "Kansas") and the State of Colorado (hereinafter "Colorado"), subject to approval by the Special Master of the United States Supreme Court.

RECITALS:

WHEREAS, Article IV-D of the Arkansas River Compact (hereinafter "the Compact"), 63 Stat. 145, provides as follows:

> This Compact is not intended to impede or prevent future beneficial development of the Arkansas River basin in Colorado and Kansas by Federal or State agencies, by private enterprise, or by combinations thereof, which may involve construction of dams, reservoir[s], and other works for the purposes of water utilization and control, as well as the improved or prolonged functioning of existing works: Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction.

WHEREAS, Arthur L. Littleworth, Special Master, in his July 1994 Report recommended that the United States Supreme Court (hereinafter "the Court") find that post-Compact well pumping in Colorado had materially depleted the usable flow of the Arkansas River at the Colorado-Kansas Stateline in violation of Article IV-D of the Compact, and the Court did so and remanded the case to the Special Master for determination of the unresolved issues, *see Kansas v. Colorado*, 514 U.S. 673, 693-694, 115 S.Ct. 1733, 1745 (1995);

WHEREAS, the Special Master recommended in his Third Report dated August 11, 2000 (hereinafter "Third Report"), that the depletions of usable Stateline flows caused by post-Compact well pumping in Colorado for the 1995-96 period be determined to be 7,935 acre-feet, and

neither Kansas nor Colorado filed an exception to this recommendation;

WHEREAS, the Special Master also recommended in his Third Report that the Court confirm his ruling that a suitable remedy in this case should be in monetary damages based upon Kansas' losses, which recommendation was confirmed by the Court, *see Kansas v. Colorado*, 533 U.S. 1, 6, 121 S.Ct. 2023, 2027 (2001);

WHEREAS, the Special Master further recommended in his Third Report that the Court confirm his ruling that the unliquidated nature of Kansas' claim for damages did not bar an award of prejudgment interest, which ruling was confirmed by the Court in *Kansas v. Colorado*, 533 U.S. at 10-12, 121 S.Ct. at 2029-2030; and

WHEREAS, Kansas and Colorado desire to reach an agreement on the amount of money damages that should be awarded to Kansas for the depletions of usable Stateline flow in violation of the Compact for the 1995-96 period and the rate of prejudgment interest that should be awarded on such damages;

NOW THEREFORE, Kansas and Colorado stipulate and agree as follows:

1. The amount of money damages, in 2002 dollars, that should be awarded to Kansas for depletions of usable Stateline flows caused by post-Compact well pumping in Colorado in violation of Article IV-D of the Compact for the 1995-96 period is $236,664.

2. Prejudgment interest on the money damages awarded to Kansas for the 1995-96 period as stipulated in paragraph 1 should be calculated at the rate of six percent

(6%) per year, simple interest, beginning on January 1, 2003, and prorated to the day of payment.

3. This stipulation is made as a compromise and settlement of the amount of money damages and the rate of prejudgment interest that should be awarded on such money damages for the 1995-96 period only. Neither this stipulation nor the payment of such damages and prejudgment interest by Colorado shall constitute an agreement on the amount of money damages that should be awarded for any other period for violation of the Compact or on the appropriate rate of prejudgment interest on money damages for any other period.

4. The States request that the money damages awarded to Kansas for the 1995-96 period, and the prejudgment interest upon such damages, as stipulated herein, be included in the Court's judgment for damages and prejudgment interest for the 1950-94 period, unless earlier paid.

STATE OF KANSAS

Phill Kline
Attorney General of Kansas

Eric Rucker
Chief Deputy Attorney General

David Davies
Deputy Attorney General

Leland E. Rolfs
Special Assistant Attorney General

/s/ John B. Draper
John B. Draper
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State of Kansas

STATE OF COLORADO

Ken Salazar
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/s/ David W. Robbins
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1441 – 18th Street, #100
Denver, Colorado 80202
Telephone: (303) 296-8100

Attorneys for Defendant
State of Colorado

APPROVED:

/s/ Arthur L. Littleworth
ARTHUR L. LITTLE WORTH
Special Master

July 14, 2003
Date

APPENDIX

Exhibit 4:

Joint Report of the States in regard
to mediation efforts, filed January 3, 2002.

No. 105, ORIGINAL

In The
SUPREME COURT OF THE UNITED STATES
October Term, 2001

STATE OF KANSAS
Plaintiff,
v.
STATE OF COLORADO,
Defendant.

JOINT REPORT OF THE STATES

(Filed Jan 3, 2002)

The State of Colorado, through its Attorney General Ken Salazar, and the State of Kansas, through its Attorney General Carla Stovall, hereby jointly report to the Special Master as required by Order of the Special Master dated September 28, 2001:

1. In order to pursue settlement of the remaining issues in the above captioned case, Kansas and Colorado retained former Montana Attorney General Joseph P. Mazurek, currently a member of the firm of Crowley, Haughey, Hanson, Toole & Dietrich, P.L.L.P., and Harley R. Harris, of the firm of Luxan & Murfitt, PLLP, as Mediators for the settlement negotiations.

2. The representatives of the States met jointly with the Mediators on September 29th (basin tour), October

17th, November 5th and 6th, December 3rd, and December 12th, 2001, and had other meetings and numerous telephonic contacts with the Mediators.

3. Unfortunately, despite the excellent services of the Mediators and the considerable efforts of the States, including extensive personal involvement of the Attorneys General themselves, it has not been possible to settle the remaining issues in the case at this time. The States, however, intend to continue to consider the possibility of settlement, especially upon completion of the final expert reports and related discovery.

4. The States have discussed the scheduling of the remaining expert reports, depositions and trial, and request that the Special Master hold a telephonic conference with the States as soon as convenient after January 1, 2002 to finalize the trial preparation schedule.

Respectfully submitted this 31st day of December, 2001.

/s/ David W. Robbins
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Attorneys for State of Colorado
*Counsel of Record

/s/ Carla J. Stovall
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Attorneys for State of Kansas
*Counsel of Record

CERTIFICATE OF SERVICE

I, John M. Cassidy, a member of the Bar of this Court, hereby certify that on the 28th day of December, 2001, I caused to be mailed, first class postage prepaid, a true and correct copy of the foregoing JOINT REPORT OF THE STATES, addressed to each of the following:

The Hon.
Arthur L. Littleworth
Special Master
Best, Best & Krieger
400 Mission Square
3750 University Ave., 3rd Flr.
Riverside, CA 92501
(Original and two copies)

James J. DuBois, Esq.
U.S. Department of Justice
General Litigation Section
999 18th Street, Suite 945
Denver, Colorado 80202

David W. Robbins, Esq.
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Jeffrey P. Minear, Esq.
Ass't to the Solicitor General
Office of the Solicitor General
U.S. Department of Justice
Constitution Ave. & Tenth St., N.W.
Washington, D.C. 20530

John B. Draper, Esq.
Montgomery & Andrews, P.A.
325 Paseo de Peralta
P.O. Box 2307
Santa Fe, NM 87504-2307

I further certify that all parties required to be served have been served.

/s/ John M. Cassidy
John M. Cassidy
Kansas Assistant
Attorney General

APPENDIX

Exhibit 5:

Order filed July 25, 2001, Denying Request of Kansas in Regard to Winter Water Storage Program.

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF KANSAS, Plaintiff, v. STATE OF COLORADO, Defendant, UNITED STATES OF AMERICA, Intervenor.	)	No. 105 Original

ORDER DENYING REQUEST OF KANSAS IN REGARD TO WINTER WATER STORAGE PROGRAM

(Filed Jul. 25, 2001)

In May of 1998 trial proceedings were held to consider Colorado's compliance with its compact obligations for the period 1995-96. I determined that depletions of usable Stateline flow resulting from postcompact well pumping during the 1995-96 period amounted to 7,935 acre-feet. My recommendations to the Supreme Court in my Third Report included that determination, bringing total depletions for the period 1950-96 to 428,005 acre-feet. No exceptions were taken to that recommendation in the Third Report.

Recently the States have been preparing for additional trial proceedings to determine depletions from well pumping, if any, for the years following 1996. Expert reports have been exchanged on compliance through 1999, on studies of irrigated acreage in Colorado, on approaches to determine the amounts of pumping, and on performance of the H-I model. Depositions of various experts have been

taken, and the time for delivering the last Kansas expert reports to Colorado on power conversion coefficients was extended to May 11, 2001. The date for commencement of the next trial segment has not yet been set.

On May 9, 2001 Kansas sought permission by letter to submit to Colorado and the United States, presumably for use in the next trial segment on compact compliance, an analysis by the Kansas experts of the need for future replacement water "to offset future depletions of usable stateline flows caused by the Colorado Winter Water Storage Program" (sometimes "WWSP"). Kansas stated that this analysis was directed toward assessing "the additional replacement water necessary for compliance by Colorado in the future with the Arkansas River Compact." Kansas made clear that the analysis was not to be the basis for any claim of past damages, but simply addressed the question of "the extent to which there will be a need in the future for Colorado water users to provide replacement water" to offset depletions from the Winter Water Storage Program.

Both Colorado and the United States responded by letters dated May 30, 2001 to this request, and Kansas replied on July 14. A final letter response was received from Colorado on July 15.

Colorado opposed the request on the grounds that it was not timely, and not within the scope of the remand order by the Supreme Court in its 1995 Opinion. Colorado's final reply letter added the argument that the issues now raised by Kansas should go first to the Arkansas River Compact Administration. The United States also opposed the Kansas request on the grounds of lack of jurisdiction. The United States referred to the conclusion

in my First Report, namely, that Kansas had failed to prove its claim that the Winter Water Storage Program caused depletions in violation of the compact. When the Supreme Court overruled Kansas' exception to that conclusion, the United States argues that the claim was effectively dismissed. The United States also contends that there are practical considerations which militate against allowing evidence of the WWSP's "future impacts" in this proceeding.

The Kansas position is that the earlier proceedings addressed only the question of whether Colorado *had* violated the compact through the WWSP during the years 1976-1985. Kansas states that this was a question of liability; what it now seeks is a remedy for the future. One of the unresolved issues in the case, according to Kansas, is whether compact violations can be expected from the WWSP "in the future." Prospective compact compliance in this regard is heightened, Kansas argues, because of efforts currently underway to enlarge the physical storage capacity of Pueblo Reservoir and to expand the operation of the Winter Water Storage Program. Kansas also replies that the suggestion that it should first seek relief before the Arkansas River Compact Administration is not helpful since that body cannot act unless both States agree.

In its 1986 complaint filed with the Supreme Court, Kansas did not directly address the impacts of the Winter Water Storage Program. The complaint first alleges that Colorado and its water users have materially depleted the usable and available Stateline flows of the Arkansas River. Specifically, the complaint then refers to the impacts of groundwater pumping of approximately 150,000 acre-feet per year; compact violations resulting from the operations of Trinidad Reservoir; and Colorado's rejection of the

Compact Administration's resolution of July 24, 1951, allegedly requiring that any re-regulation of native river water be approved by the Compact Administration. This latter allegation, which was the subject of a major pretrial order, related to Pueblo Reservoir and to the operation of the Winter Water Storage Program. In a pretrial order dated September 15, 1989 [found in my First Report, Vol. III at 338], I granted Colorado's Motion for Partial Summary Judgment, determining that neither the 1951 Resolution of the Compact Administration, nor the compact itself, required prior Administration approval for the re-regulation of native river waters, as found in the Winter Water Storage Program. However, I reserved for trial the question of whether the actual impact of the program on usable Stateline flows caused a violation of the compact.

The Winter Water Storage Program began in 1976 upon completion of Pueblo Reservoir, a United States facility. Under the program, Arkansas River flows were stored in Pueblo Reservoir during the winter for later summer irrigation. Previously, winter flows had been diverted in part to irrigate bare fields, thereby increasing the soil moisture for the next growing season. The basic issue was whether winter storage and later summer use caused material Stateline depletions compared to the historic practices of winter irrigation. Evidence on the program's operation was received from its inception in 1976 through 1986-87. This segment of the trial dealt only with claimed depletions through 1985. The WWSP went through several annual changes, and was finally approved by a decree of the Colorado Water Court in 1987. That decree basically confirmed the operating plan that had been in effect since 1983.

A substantial portion of the liability phase of the trial was devoted to the Winter Water Storage Program. Indeed, the principal involvement of the United States focused on that issue. The evidence addressed the early development of the program; notice to Kansas at least as early as 1970; a computer model analysis by the USGS before the program was commenced predicting that the program would increase rather than decrease Stateline flows; computer modeling by both Kansas and Colorado on the impact of the program; expert testimony by the United States on the accuracy of the Kansas modeling efforts; extensive expert testimony comparing consumptive use under the program with that occurring under prior winter irrigation practices; testimony on the merits of using the Blainey-Criddle equation to determine potential evapotranspiration versus use of the Ritchie methodology; and numerous other technical matters fundamental to the computer model studies. In short, during the liability phase of the trial, there was a comprehensive evaluation of the entire program.

I concluded that Kansas did not prove that the WWSP caused material Stateline depletions, and Kansas' exception to that finding was overruled by the Supreme Court. (514 U.S. 673, 131 L.Ed.2d 759, 115 S.Ct. 1733 (1995) As Kansas notes, my conclusion was "not to say that the WWSP has not adversely impacted Stateline flows, but rather that Kansas has failed to prove that it has." (First Report, Vol. II at 335.) Nonetheless, Kansas had a full opportunity to prove its claim. Kansas did not do so, and the Winter Water Storage Program as it has been known in this case may not be considered now to cause Stateline depletions in violation of the compact.

The Stateline depletions which have been determined thus far have resulted only from postcompact well pumping. Yet Kansas now seeks to introduce expert testimony assessing the "additional replacement water" which may be necessary in the future "to offset depletions to usable flows at the Stateline due to the Winter Water Storage Program." This supply, it is said, would be a "supplement" to the replacement water otherwise needed to offset the effects of well pumping. However, I cannot see how additional replacement water can be ordered without overturning the Supreme Court's prior decision on liability in regard to the WWSP. Kansas states that it has no intent "to ask for any revisions to the current or future operating procedures" of the WWSP. If that is true, the Kansas claims have already been fully heard and determined, and continued operation of the same program in the future does not give rise to a compact violation.

There is some suggestion, however, that what Kansas fears is a future expansion of the program "which will exacerbate the effects of the current Program." This apparently turns on the possible enlargement of the storage capacity of Pueblo Reservoir, although Colorado points out that such enlargement is far from being authorized. Apparently all that has been done is to call for a study. On May 3, 2001, H.R.1714 was introduced to authorize, among other things, the Secretary of the Interior to *conduct studies* for the enlargement of Pueblo Dam and Reservoir and Sugarloaf Dam and Turquoise Lake, Fryingpan-Arkansas Project, Colorado. There is not even an indication that the bill has become law.

If the Winter Water Storage Program should be expanded in the future, Kansas will then have to assess the impact of such new development and take whatever

action that may be appropriate. By virtue of this case, however, there is not continuing jurisdiction in the Supreme Court over potential future violations of the compact. Put in traditional terms, Kansas does not present an issue that is ripe for determination. My task in this case is to assist the Court in deciding the issues that Kansas put forward in its 1986 complaint, as amended, and the case is defined and limited by those issues.

Kansas, understandably, may be reluctant to put faith in the compact provisions and the Arkansas River Compact Administration to investigate and remedy potential violations. Nonetheless, the compact is the agreement the States have made, and the Supreme Court may not be viewed as a handy replacement for the provisions of the compact. Moreover, the future may not be the same as the past. The relations between the States during the course of this trial have been generally marked by exemplary cooperation. Agreements have been reached on some issues that otherwise would have been extremely expensive and time consuming to try. It is to be hoped that this same good faith approach may carry over into the Compact Administration after a final judgment has been entered here.

DATED: July 25, 2001

/s/ Arthur L. Littleworth
ARTHUR L. LITTLEWORTH
Special Master

PROOF OF SERVICE BY MAIL

STATE OF CALIFORNIA, COUNTY OF RIVERSIDE

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to the within entitled action; my business address is Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502.

I am readily familiar with Best, Best & Krieger's practice for collecting and processing correspondence for mailing with the United States Postal Service. Under that practice, all correspondence is deposited with the United States Postal Service the same day it is collected and processed in the ordinary course of business.

On July 25, 2001, I served the within **ORDER DENYING REQUEST OF KANSAS IN REGARD TO WINTER WATER STORAGE PROGRAM** by placing a copy of the document in a separate envelope for each addressee named below and addressed to each such addressee as follows:

John B. Draper, Esq.
Montgomery & Andrews
325 Paseo de Peralta
P.O. Box 2307
Santa Fe, New Mexico 87504-2307

David W. Robbins, Esq.
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Jeffrey P. Minear
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Office of the Solicitor General
United States Department of Justice
Constitution Avenue & Tenth Street, N.W.
Washington D.C. 20530

James J. DuBois, Esq.
U.S. Department of Justice
General Litigation Section
999 18th Street, Suite 945
Denver, Colorado 80202

On July 25, 2001, at the office of Best, Best & Krieger, 3750 University Avenue, 400 Mission Square, Riverside, California 92502, I sealed and placed each envelope for collection and deposit by Best, Best & Krieger in the United States Postal Service, following ordinary business practices.

I declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Executed on July 25, 2001, at Riverside, California.

/s/ Sandra L. Simmons
Sandra L. Simmons

APPENDIX

Exhibit 6:

Kansas Exhibit 1123, Amended Rules and Regulations Governing the Diversion and Use of Tributary Ground Water in the Arkansas River Basin, Colorado.

AMENDED
RULES AND REGULATIONS
GOVERNING THE DIVERSION AND USE
OF TRIBUTARY GROUND WATER
IN THE ARKANSAS RIVER BASIN, COLORADO

(Filed June 4, 1996)

ORDER OF THE STATE ENGINEER

IT IS ORDERED that the Rules and Regulations governing the use, control, and protection of surface and ground water rights located in the Arkansas River and its tributaries, which rules and regulations became effective on February 19, 1973, shall be amended and replaced by the following rules and regulations which are adopted and approved by the state engineer.

AMENDED RULES AND REGULATIONS

Rule 1. *Scope*. These Rules apply to all diversions of tributary ground water in the Arkansas River basin in Colorado except diversions by decreed or permitted wells as described in section 37-92-602, wells located within a designated ground water basin which withdraw designated ground water, decreed and/or permitted wells which withdraw nontributary ground water, and exposure of ground water in connection with extraction of sand and gravel by open mining as defined in section 34-32-103(9), 14 C.R.S. In addition, these Rules shall not apply to ground water within the Dawson, Denver, Arapahoe, or Laramie-Fox Hills aquifers in the Denver Basin, as shown on the attached map, or to ground water within the Cheyenne and Dakota aquifers.

Rule 2. *Definitions.*

The following definitions are applicable to these Rules:

a. "Decreed pre-compact ground water rights" mean water rights to divert tributary ground water in the Arkansas River Basin in Colorado with a priority senior to December 14, 1948, awarded in (1) decrees entered prior to June 7, 1969; or (2) decrees which were entered in proceedings which were pending on that date; or (3) decrees which were entered on or after June 7, 1969, by the Water Judge for Water Division 2, with respect to water rights which are diverted by means of wells, the priorities for which had not been established or sought in any prior decree or proceeding, if the person claiming the water right filed an application for determination of the water right and priority not later than July 1, 1972, and such application was approved and confirmed by the Water Judge for Water Division 2.

b. "Division engineer" means the division engineer for Water Division 2.

c. "Durbin usable flow method with the Larson coefficients" means the Durbin approach to determine depletions to usable Stateline flow with modifications made by Steven Larson, as described in the July 1994 Report by Arthur L. Littleworth, Special Master, in *Kansas v. Colorado*, No. 105, Original, United States Supreme Court.

d. "Kansas Hydrologic-Institutional Model" means the computer model, as revised by the Kansas replacement experts, *Colorado*, No. 105, Original, United

States Supreme Court, as described in the July 1994 Report by Arthur L. Littleworth, Special Master.

e. "Out-of-priority depletions to senior surface water rights in Colorado" mean stream depletions caused by diversions of tributary ground water in the Arkansas River Basin in Colorado which would deprive senior surface water rights in Colorado of the amount of water to which said surface water rights would have been entitled in the absence of such ground water diversions.

f. "Post-compact ground water diversions" mean (1) diversions of tributary ground water from the Valley Fill Aquifer and surficial aquifers along the Arkansas River between Pueblo and the Stateline by well users having water rights with a priority of, or junior to, December 14, 1948, and (2) diversions of tributary ground water by well users having decreed pre-compact water rights for irrigation use in excess of the pre-compact pumping allowances of such rights, except to the extent permitted by Rule 3.3.

g. "Stream depletions" means depletions to the Arkansas River or other natural streams in the Arkansas River Basin in Water Division 2 caused by diversions of tributary ground water in the Arkansas River Basin in Colorado.

h. "Tributary ground water in the Arkansas River Basin in Colorado" means all underground water as defined in section 37-92-103(11), 15 C.R.S., in the State of Colorado tributary to the Arkansas River or other natural streams in the Arkansas River Basin in Water Division 2.

i. "Unit response functions" mean a mathematical method to determine the timing and location of stream depletions or accretions from a unit stress on an aquifer.

j. "Usable Stateline flow" means the flow of waters of the Arkansas River, as defined in Article III of the Arkansas River Compact, as determined by gaging stations located at or near the Stateline in accordance with the Arkansas River Compact, the depletion of which would materially deplete waters of the Arkansas River in usable quantity or availability for use to the water users in Kansas under the Arkansas river Compact.

k. "Valley Fill Aquifer and surficial aquifers along the Arkansas River between Pueblo and the Stateline" mean those aquifers as delineated on the attached map.

l. "Waters imported into the Arkansas River Basin" or "imported waters" mean waters brought into the Arkansas River Basin from other river basins.

m. "Well user" means the owner of a water right to divert tributary ground water in the Arkansas River Basin in Colorado and any person having the right to use such a water right owned by another, including successors, lessees, contractees, or assigns.

n. Any other term used in these Rules that is defined in Article 90 or 92, 15 C.R.S., or in Article III of the Arkansas River Compact, is used with the meaning given therein.

Rule 3. *Ground Water Diversions and Depletions Affecting Usable Stateline Flow.*

Rule 3.1. *Ground Water Diversions for Irrigation Use by Post-compact Ground Water Rights Affecting Usable Stateline Flow.* On or after June 1, 1996, all diversions of tributary ground water for irrigation use from the Valley Fill Aquifer and surficial aquifers along the Arkansas River between Pueblo and the Stateline by well users having water rights with a priority of, or junior to, December 14, 1948, shall be totally discontinued unless depletions to usable Stateline flow caused by such diversions are replaced in accordance with a plan approved by the state and division engineers pursuant to these Rules.

Rule 3.2. *Ground Water Diversions for Irrigation Use By Decreed Pre-Compact Ground Water Rights Affecting Usable Stateline Flow.* On or after June 1, 1996, all diversions of tributary ground water for irrigation use from the Valley Fill Aquifer and surficial aquifers along the Arkansas River between Pueblo and the Stateline by well users having decreed pre-compact ground water rights shall be limited to an aggregate total of 15,000 acre-feet per year (November 1 through October 31) unless depletions to usable Stateline flow caused by diversions of amounts greater than 15,000 acre-feet per year are replaced in accordance with a plan approved by the state and division engineers pursuant to these Rules.

Rule 3.3. *Pre-compact Pumping Allowances.* For the purpose of implementing Rule 3.2, each decreed pre-compact ground water right for irrigation use from the Valley Fill Aquifer and surficial aquifers along the Arkansas River between Pueblo and the Stateline shall be allocated an annual pre-compact pumping allowance for the purpose of determining depletions to usable Stateline Flow. The annual pre-compact pumping allowance for each decreed pre-compact ground water right for irrigation use

shall be determined by multiplying 15,000 acre-feet times the decreed capacity of that ground water right, weighted depending on whether the ground water right is used as a supplemental or as a sole source supply, and dividing by the total weighted decreed capacity of all decreed pre-compact ground water rights for irrigation use. Ground water rights used as a supplemental supply shall be given a weight of sixty percent (60%) and ground water rights used as a sole source supply shall be given a weight of one-hundred percent (100%). The state and division engineers shall prepare a list of all decreed pre-compact ground water rights for irrigation use from the Valley Fill Aquifer and surficial aquifers along the Arkansas River between Pueblo and the Stateline by the effective date of these Rules, which list shall set forth the annual pre-compact pumping allowance for each such right. A well user having a decreed pre-compact ground water right for irrigation use may divert more than the annual pre-compact pumping allowances of that right in any one year (November 1 through October 31), provided, that the well user having such a right is included in a plan approved by the state and division engineers which includes other well users having such rights and who will not divert more than their combined annual pre-compact pumping allowances in any one year unless they replace depletions to usable Stateline flow caused by such additional diversions. *Notwithstanding this annual pre-compact pumping allowance, well users having decreed pre-compact ground water rights for irrigation use shall be subject to all other rules and regulations applicable to diversions of tributary ground water in the Arkansas River Basin in Colorado, including replacement of out-of-priority depletions to senior surface water rights in Colorado pursuant to Rule 4.1.*

Rule 3.4. *Determination of Depletions to Usable Stateline Flows.* The state and division engineers shall use the Kansas Hydrologic-Institutional Model (HIM) and the Durbin usable flow method with the Larson coefficients, or such other method approved by the Special Master, the United States Supreme Court, or the Arkansas River Compact Administration to determine depletions to usable Stateline flow caused by post-compact ground water diversions for irrigation use. To the extent that replacement of out-of-priority depletions to senior surface water rights in Colorado in accordance with these Rules is not sufficient to replace all depletions to usable Stateline flow caused by post-compact ground water diversions of irrigation use, the state and division engineers shall allocate all unreplaced depletions to usable Stateline flow caused by post-compact ground water diversions for irrigation use to well users based upon the well's location, the amount pumped, whether the well is a sole source or supplemental source of supply, the method of irrigation, and such other information as is available to the state and division engineers to allocate such unreplaced depletions, and taking into account reductions in depletions to usable Stateline flow resulting from augmentation water provided in accordance with these Rules, including return flows from imported or other fully consumable waters to which well users, or their successors, lessees, contractees, or assigns are entitled based on their right to use or reuse such return flows.

Rule 3.5. *Conditions for Approval of Plans Allowing Post-compact Ground Water Diversions.* As a condition to approval of any plan allowing post-compact ground water diversions for irrigation use, the state and division engineers shall require replacement of any and all depletions

to usable Stateline flow and may require a well user or entity acting on behalf of well users to furnish water in advance to replace anticipated depletions to usable Stateline flow which will not be replaced by replacement of out-of-priority depletions to senior surface water rights in Colorado.

Rule 4. *Ground Water Diversions from the Valley Fill Aquifer and Other Specified Aquifers Affecting Senior Surface Water Rights in Colorado.*

Rule 4.1. *Diversions of Tributary Ground Water from the Valley Fill Aquifer and Other Specified Aquifers Affecting Senior Surface Water Rights in Colorado.* On or after June 1, 1996, all diversions of tributary ground water

a. from the Valley Fill Aquifer and surficial aquifers along the Arkansas River between Pueblo and the Stateline; and

b. from the alluvium of Fountain Creek and the alluvium of the Arkansas River from Pueblo to Pueblo Dam, as shown on the attached map,

shall be totally discontinued unless out-of-priority depletions to senior surface water rights in Colorado are replaced in accordance with: (1) a decreed plan for augmentation approved by the Water Judge in accordance with the procedures of sections 37-92-302 to 37-92-305, 15 C.R.S.; or (2) a plan approved by the state and division engineers in accordance with these Rules; or (3) a substitute supply plan approved by the state engineer pursuant to section 37-80-120 which is consistent with these Rules. Replacement of depletions in accordance with this Rule

shall not relieve a well user of an obligation to replace depletions to usable Stateline flow.

Rule 4.2. *Determination of Stream Depletions; Presumptive Stream Depletions.* To determine stream depletions for plans required by Rule 4.1, the state and division engineers shall be governed by the following:

a. For diversions of ground water used as a supplemental supply for flood and furrow irrigation, the presumptive stream depletions shall be thirty percent (30%) of the amount diverted. The state and division engineers may increase the presumptive stream depletions to more than thirty percent (30%), but not more than the presumptive stream depletions for diversions of ground water used as a sole source of supply for flood and furrow irrigation, for well users who use ground water as a supplemental supply for flood and furrow irrigation but do not have a reasonably adequate surface supply for the acreage irrigated (for example, well users who have sold a portion of their surface water rights or do not own sufficient shares in a mutual ditch company to irrigate the acreage irrigated compared to other shareholders in the company). To determine whether a well user has a reasonably adequate surface supply for the acreage irrigated, the state and division engineers shall consider the acreage which may be legally irrigated with the surface water rights owned or used by the well user and the relative amount of surface and ground water applied to such acreage averaged over the previous five years. The following table may be used as a guideline for increasing the presumptive stream depletions:

Surface Water Used (%)	Flood/Furrow Depletion (%)
50 or greater	30
40-49	33
30-39	36
20-29	39
10-19	42
1-9	45
0	50

b. For diversions of ground water used as a sole source of supply for flood and furrow irrigation, the presumptive stream depletions shall be fifty percent (50%) of the amount diverted.

c. For diversions of ground water used as a sole source of supply in sprinkler irrigation systems, the presumptive stream depletions shall be seventy-five percent (75%) of the amount diverted.

d. For diversions of ground water for other uses, the state and division engineers shall determine stream depletions based on information submitted by the well user and the individual facts and circumstances of each case or may establish presumptive stream depletions for particular uses.

Rule 4.3. *Review and Revision of Presumptive Stream Depletions*. The presumptive stream depletions established in Rule 4.2 shall be reviewed by the state engineer annually to determine whether the presumptive stream depletions are adequate to prevent material injury to senior surface water rights in Colorado and depletions to usable Stateline flows, and the presumptive stream depletions shall be revised as the state engineer determines is necessary. The

state engineer shall publish any revisions to the presumptive stream depletions in the manner prescribed by statute for changes to these Rules and regulations.

Rule 5. *Other Diversions of Tributary Ground Water Affecting Senior Surface Water Rights in Colorado.* On or after June 1, 1996, all diversions of tributary ground water in the Arkansas River Basin within the scope of these Rules and not covered by Rule 4.1 shall be totally discontinued unless out-of-priority depletions to senior surface water rights in Colorado are replaced in accordance with: (1) a decreed plan for augmentation approved by the Water Judge in accordance with the procedures of sections 37-92-302 to 37-92-305, 15 C.R.S.; or (2) a plan approved by the state and division engineers in accordance with these Rules; or (3) a substitute supply plan approved by the state engineer pursuant to section 37-80-120 which is consistent with these Rules. To determine stream depletions for plans required by this Rule, the state and division engineers shall determine such depletions based on an acceptable site-specific depletion analysis provided by the well user or plan proponent or, in the absence of such an analysis, shall determine stream depletions in accordance with Rule 4.2.

Rule 6. *Criteria for Determining the Adequacy of Augmentation Water*. In reviewing plans submitted pursuant to these Rules, the state and division engineers shall determine the adequacy of each source of water proposed for use as augmentation water, including, where necessary, the historical consumptive use of each water right. This determination shall be based upon acceptable studies of the augmentation source provided by the well user or plan proponent. Return flows from diversions of waters imported into the Arkansas River Basin or other fully

consumable waters proposed for use as augmentation water shall be determined by the state and division engineers based on acceptable studies and information provided by the well user or plan proponent. A water right, other than imported waters or other fully consumable waters, which has not been decreed for augmentation use may be used as augmentation water in a plan approved by the state and division engineers pursuant to these Rules; however, as a condition to approval of a plan, the state and division engineers may require the well user or plan proponent to file an application for change of water right and obtain a decree approving the use of the water right for augmentation use within a reasonable period of time. In no case, however, shall a water right, other than imported waters or other fully consumable waters, which has not been decreed for augmentation use be used as a permanent source of augmentation water for more than 10 years in a plan approved by the state and division engineers pursuant to these Rules.

Rule 7. *Conditions for Approval of Plans.* Based on stream depletions determined in accordance with these Rules, the state and division engineers may approve a plan to divert tributary ground water which provides sufficient augmentation water in amount, time, and location to replace out-of-priority depletions to senior water rights in Colorado and any and all depletions to usable Stateline flow caused by such diversions. Acceptable plans shall be approved annually and shall include such terms and conditions as, in the opinion of the state and division engineers, are necessary to prevent injury to senior surface water rights in Colorado and depletions to usable Stateline flow. Plans may be amended during the year if approved by the state and division engineers. As a

condition to approval of a plan, the state and division engineers may require augmentation water in excess of the amount necessary to replace stream depletions determined in accordance with Rule 4.2 or Rule 5 to address situations where projected augmentation water may not be available, such as a dry year.

Rule 8. *Determination of the Timing and Location of Stream Depletions; Unit Response Functions.* To determine the timing and location of stream depletions caused by diversions of tributary ground water, the state and division engineers shall develop unit response functions for wells diverting from the Valley Fill Aquifer and surficial aquifers along the Arkansas River between Pueblo and the Stateline. These unit response functions may be used to determine the timing and location of return flows from diversions of imported waters and other fully consumable waters. To determine the timing and location of stream depletions caused by other diversions of tributary ground water, water users may use appropriate ground water models or other methods acceptable to the state and division engineers to calculate the timing and location of stream depletions based on the location of the well, the rate of pumping, the use being made of the ground water, and the aquifer's boundaries and characteristics.

Rule 9. *Responsibilities of the State and Division Engineers.* The state and division engineers shall administer, distribute, and regulate ground water within the scope of these Rules in accordance with the provisions of the Arkansas River Compact, the constitution of the state of Colorado and other applicable laws, and written instructions and orders of the state engineer, including these Rules, and no other official, board, commission, department, or agency of the state of Colorado, except as

provided in article 92 of title 37, C.R.S., and article 8 of title 25, C.R.S., has jurisdiction and authority with respect to said administration, distribution, and regulation. The state and division engineers shall curtail all diversions of ground water within the scope of these Rules, the depletions from which are not replaced as to prevent out-of-priority depletions to senior water rights in Colorado and depletions to usable stateline flow in accordance with these Rules.

Rule 10. *Responsibilities of Well Users and Other Entities Subject to These Rules*. Well users alone or in concert may submit plans in accordance with these Rules. Water conservancy districts, irrigation districts, mutual or public ditch and reservoir companies, municipalities, or other entities which are governed by a board of directors may initiate and submit plans in accordance with these Rules. Well users shall be responsible for complying with these Rules, verifying the accuracy of information submitted in accordance with these Rules, and complying with the terms and conditions of plans approved in accordance with these Rules. Water conservancy districts, irrigation districts, mutual or public ditch and reservoir companies, municipalities, or other entities which are governed by a board of directors which initiate and submit plans in accordance with these Rules shall be responsible for notifying the state and division engineers of any well user in a plan approved in accordance with these Rules who is not in compliance with the terms of the plan and for doing all things required by such plans; however, the state and division engineers shall be responsible for enforcement of these Rules and the terms of the Arkansas River Compact; and, notwithstanding the submission of a plan by an entity on behalf of a well user, should the plan prove

insufficient, the well user shall be responsible for replacement of out-of-priority depletions to senior surface rights in Colorado and depletions to usable Stateline flow.

Rule 11. *Plans for June 1, 1996, to March 31, 1997, and Thereafter*. To provide a reasonable period to allow well users to develop plans required by these Rules and to secure the augmentation water necessary for such plans, the state and division engineers may approve a plan to divert tributary ground water for the period June 1, 1996, to March 31, 1997, if the well user or an entity acting on behalf of the well user provides sufficient augmentation water in amount, time, and location to replace 60 percent (60%) of the out-of-priority depletions to senior surface water rights in Colorado determined in accordance with these Rules and all depletions to usable Stateline flow caused by such diversions. On or after April 1, 1997, full replacement of out-of-priority depletions to senior surface rights in Colorado and depletions to usable Stateline flow shall be required and no plan shall be approved which does not provide for full replacement of such depletions in accordance with these Rules.

Rule 12. *Submission of Monthly Pumping or Power Records*. Any well user or entity acting on behalf of well users who desires approval of a plan to divert tributary ground water pursuant to these Rules must furnish records to the division engineer, in a manner prescribed by the division engineer, on a monthly basis, or a less frequent basis if authorized by the division engineer, of the amounts diverted pursuant to the plan. In the case of wells powered by electricity, as a condition to approval of a plan, the well user must authorize the power supplier to provide power records to the division engineer on a monthly basis. Further, if authorized by statute, in the

event the well user fails to comply with the terms of a plan approved pursuant to these Rules or fails to furnish or pay for augmentation water necessary for such a plan, the state or division engineer may issue an order to the power supplier to discontinue energy to the well unless and until the well user has complied with the terms of such a plan or furnished or paid for augmentation water necessary for such a plan.

Rule 13. *Information Which Must Be Furnished.* By June 1, 1996, and by February 1 of each year thereafter (except as provided below), any well user who desires approval of a plan to divert tributary ground water pursuant to these Rules, or will be included in a plan submitted by an entity on behalf of the well user, shall file a signed statement with the division engineer, on a form approved by the division engineer, containing the following information for each well used by the well user to be included in the plan:

a. the name, address, and telephone number of the well user and the well owner, if different than the well user;

b. the name of the entity which will provide augmentation water;

c. the location of each well;

d. the structure identification number (if one has been assigned) of each well. If no structure identification number has been assigned to a well, the well user shall also furnish the following information:

(1) the permit or registration number of each well,

(2) the appropriation date and adjudication date of each water right diverted through each well,

(3) the court case number of the proceeding in which each water right diverted through each well was decreed;

e. the use of ground water diverted from each well;

f. the source of energy used to divert ground water from each well;

g. in the case of wells powered by electricity, the name of the electric utility company which supplies energy used to divert ground water from each well, the power meter/service number as it appears on the bill from the electric utility company, and the account number;

h. in the case of wells used for irrigation,

(1) whether each well is used as a supplemental irrigation supply or a sole source of irrigation supply,

(2) the method of irrigation (flood, furrow, sprinkler, surge, drip, etc.) of each well,

(3) if used as a supplemental irrigation supply, a description of the surface rights or the name of the ditch or reservoir company and number of shares used in conjunction with each well; and

i. in the case of diversions of ground water for uses other than irrigation, information sufficient to allow the state and division engineers to determine stream depletions.

An entity acting on behalf of well users may compile and submit the foregoing information for well users in a manner acceptable to the division engineer, but the well

user must sign a statement on a form approved by the division engineer which verifies the information submitted by the entity. These forms shall be maintained in the files of the entity and a copy furnished to the division engineer. If a well user fails to file a statement in compliance with this Rule, the state and division engineers may deny a plan to divert tributary ground water or require the well user to be excluded from a plan submitted by an entity on behalf of the well user until the well user has complied with this Rule.

Once a well user has filed a signed statement with the division engineer in compliance with this Rule, or an entity acting on behalf of the well user has submitted the foregoing information for the well user in compliance with this Rule, the well user shall not be required to submit a statement thereafter to be included in a plan unless any information on the statement has changed; however, the state and division engineers may require any well user to provide additional information in the future to determine whether the well user has a reasonably adequate surface supply.

Rule 14. *Applications for Approval of Plans to Divert Tributary Ground Water*. No later than June 1, 1996, and no later than March 1 of each year thereafter, a well user or an entity acting on behalf of well users who desires approval of a plan to divert tributary ground water pursuant to these Rules must file with the division engineer an application in writing setting forth a complete description of the plan, including:

a. the name and address of each well user who will be included in the plan;

b. the information required in paragraphs c. through i. of Rule 13 for each well which will be included in the plan;

c. an estimate of the amount of ground water to be diverted by well users who will be included in the plan;

d. each source of water to be used as augmentation water in the plan and the amount of augmentation water available on a monthly basis;

e. the amount, time, and location of stream depletions from ground water diversions under the plan or how the amount, time, and location of such depletions will be determined; and

f. a detailed description of how out-of-priority depletions to senior water rights in Colorado and depletions to usable Stateline flow will be replaced under the plan.

If a well user or entity acting on behalf of well users who seeks approval of a plan to divert tributary ground water pursuant to these Rules does not know every source of water to be used as augmentation water in a plan or the amount of augmentation water available by March 1 of any given year, the state and division engineers may grant temporary approval of a plan until June 1 upon such terms and conditions as, in the opinion of the state and division engineers, will be adequate to prevent out-of-priority depletions to senior surface water rights in Colorado and depletions to usable Stateline flow until the well user or entity acting on behalf of well users can provide a complete description of the plan.

Rule 15. *Orders, Costs, and Attorneys' Fees*. Any person who diverts ground water in violation of these

Rules or in violation of the terms of a plan approved by the state and division engineers pursuant to these Rules shall be subject to an order by the state or division engineer issued pursuant to section 37-92-502, 15 C.R.S., and may be subject to court proceedings and the state's costs, including reasonable attorney fees, and any fine authorized by statute. Because ground water diversions in violation of these Rules could deplete usable Stateline flows in violation of the Arkansas River Compact or cause material injury to water rights in Colorado having senior priorities, the state or division engineer may enter upon, and order any person to permit the entry upon, private property to plug, lock, or otherwise disable any well which has been used to divert ground water in violation of these Rules or in violation of a plan approved pursuant to these Rules.

Rule 16. *Tabulation, Pumping Records, and Summaries of Plans.* To ensure compliance with these Rules, the state and division engineers shall tabulate diversions of ground water from the aquifers listed in Rule 4.1 at regular intervals and shall make such tabulations available for inspection by the public in the office of the division engineer. The state and division engineers shall prepare annual summaries of plans which have been approved by the state and division engineers allowing diversions of ground water from the aquifers listed in Rule 4.1 and shall make such summaries available for inspection by the public in the office of the division engineer. As a condition to approval of any plan to divert ground water pursuant to these Rules, the state and division engineers may require a well user or an entity submitting a plan on behalf of well users to prepare a summary of diversions of ground water and replacement of depletions under the plan.

Rule 17. *Severability.* If any portion of these Rules is found to be invalid, the remaining portion of the Rules shall remain in force and unaffected.

Rule 18. *Effective date.* These amended Rules shall become effective June 1, 1996, and shall remain in effect until amended as provided by law. The Statement of Basis and Purposes for these Rules has been filed with the water court and is available for review at the office of the state engineer in Denver, Colorado and at the office of the division engineer in Pueblo, Colorado.

Dated this 4th day of June, 1996.

STATE OF COLORADO

/s/ Hal D. Simpson
HAL D. SIMPSON
State Engineer

BY THE COURT

/s/ John Anderson
JOHN ANDERSON
Water Court Judge
Water Division 2
State of Colorado

APPENDIX

Exhibit 7:

Kansas Exhibit 1134, Memorandum dated February 18, 2002, from AGUA Board of Directors to AGUA Membership.

To: AGUA Membership

From: AGUA Board of Directors

Date: February 18, 2002

RE: "2002 Drought"

This letter is to inform you of the drought situation we are facing this year! Due to a lack of sufficient storage in the reservoirs, the dry winter and water available to the farmers. The AGUA Board of Directors hereby warns all farmers to be prepared for a cut of at least 50% of water available to the well users in AGUA and the cost of the water is going to beat least 50% more (possibly $25.00 per acre foot, rather than the $10.00 per acre foot of depletions last year) than in the years past. Please consider this notice as a warning for the farmers in AGUA.

We, AGUA, will allocate water on a percentage basis for each member in AGUA according to purchases made in the last five years. Depending on what your last five year average is, will be determined on how much water you will be offered. Your bill will go out in the first week of March and must be received prior to April 1st. If additional waters come available, these waters will be offered on the same percentage as it was allocated at first.

Due to the drought conditions this year, AGUA, CWPDA, The Division of Water Resources, CSU Extension Office & the Conservancy District is planning a workshop for our members in our augmentation plans. On March 1st, in LaJunta at the Otero Junior College on Friday, we will have our first workshop. The second workshop will be held the following day at the Lake Pueblo State Park just to the South of the Pueblo Dam on Saturday. The workshops will help you in many ways from measuring and keeping track

of your water usage to ideas on what, how and how much to plant for this growing season. Attached is a press release by the CSU Extension Service from Rocky Ford. If you are able to attend the meeting please come to either of the workshops. Also, please call the AGUA office and let us know which date you can make it. Although reservations are not required, we want to make sure we have plenty of room and refreshments for everyone.

Hope to see you there!

Jeanette Bryan, Manager

APPENDIX

Exhibit 8:

Colorado Exhibit 1384, Table 11, Comparison of AGUA 2002 Replacement Requirements and Replacement Source Availability.

TABLE 11

COMPARISON OF AGUA 2002 REPLACEMENT REQUIREMENTS AND REPLACEMENT SOURCE AVAILABILITY

March 1, 2002 (includes Dummy Well Depletions)

(all amounts in acre-feet)

Location		Apr 2002	May 2002	Jun 2002	Jul 2002	Aug 2002	Sep 2002	Oct 2002	Nov 2002	Dec 2002	Jan 2003	Feb 2003	Mar 2003	Plan Year Total
Arkansas River Below Pueblo (Rule 3, 4 and Rule 5 Wells)														
Total Replacement Required:		556.0	737.7	958.8	1,235.2	1,384.8	1,383.4	1,331.3	1,100.7	862.2	725.4	622.9	572.5	11,470.8
Excelsior Ditch	Amount Available	0.0	186.0	465.0	279.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	930.0
@ 75% of Average	Credit (no loss)	0.0	186.0	465.0	279.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	930.0
Cherokee Metro	Amount Available	86.0	63.0	59.0	58.0	57.0	58.0	61.0	65.0	82.0	89.0	95.0	89.0	862.0
Return Flows	Credit (11.8 % loss)	75.9	55.6	52.0	51.2	50.3	51.2	53.8	57.3	72.3	78.5	83.8	78.5	760.4
Pueblo	Amount Available	40.0	200.0	190.0	445.0	740.0	785.0	730.0	470.0	191.0	90.0	20.0	0.0	3,901.0
Reusable Water	Credit (no loss)	40.0	200.0	190.0	445.0	740.0	785.0	730.0	470.0	191.0	90.0	20.0	0.0	3,901.0
SECWCD Fry-Ark	Amount Available	455.0	319.0	285.0	498.0	635.0	592.0	588.0	607.0	621.0	573.0	535.0	512.0	6,220.0
1st Use & RF	Credit (no loss)	455.0	319.0	285.0	498.0	635.0	592.0	588.0	607.0	621.0	573.0	535.0	512.0	6,220.0
Total All Sources	Amount Available	581.0	768.0	999.0	1,280.0	1,432.0	1,435.0	1,379.0	1,142.0	894.0	752.0	650.0	601.0	11,913.0
	Total Credits	570.9	760.6	992.0	1,273.2	1,425.3	1,428.2	1,371.8	1,134.3	884.3	741.5	638.8	590.5	11,811.4
Excess(+) or Deficit(-)		14.8	22.9	33.2	38.0	40.5	44.8	40.5	33.6	22.1	16.1	15.9	18.0	340.5
Arkansas River Above Pueblo (Rule 5 Wells)														
Total Replacement Required:		7.3	9.7	12.4	15.5	16.2	15.2	13.5	10.3	7.9	6.9	6.3	6.4	127.6
Pueblo	Amount Available	8.0	11.0	13.0	17.0	17.0	16.0	15.0	12.0	9.0	8.0	7.0	7.0	140.0
Reusable Water	Credit (1% loss)	7.9	10.9	12.9	16.8	16.8	15.8	14.9	11.9	8.9	7.9	6.9	6.9	138.6
Excess(+) or Deficit(-)		0.7	1.2	0.5	1.3	0.6	0.7	1.4	1.5	1.0	1.0	0.6	0.5	11.0
Fountain Creek (Rule 4 and Rule 5 Wells)														
Total Replacement Required:		51.7	92.1	123.1	170.2	151.5	143.7	114.5	58.9	37.2	29.5	24.9	31.6	1,029.0
SECWCD Fry-Ark	Amount Available	25.0	50.0	80.0	125.0	110.0	100.0	70.0	15.0	10.0	5.0	5.0	5.0	600.0
Return Flows	Credit (no loss)	25.0	50.0	80.0	125.0	110.0	100.0	70.0	15.0	10.0	5.0	5.0	5.0	600.0
Cherokee Metro	Amount Available	30.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	35.0	30.0	25.0	30.0	500.0
Return Flows	Credit (10% loss)	27.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	31.5	27.0	22.5	27.0	450.0
Total All Sources	Total Available	55.0	100.0	130.0	175.0	160.0	150.0	120.0	65.0	45.0	35.0	30.0	35.0	1,100.0
	Total Credits	52.0	95.0	125.0	170.0	155.0	145.0	115.0	60.0	41.5	32.0	27.5	32.0	1,050.0
Excess(+) or Deficit(-)		0.3	2.9	2.0	(0.2)	3.5	1.3	0.5	1.1	4.3	2.5	2.6	0.4	21.0
All Reaches (All Wells)														
Total Replacement Required		615.0	839.6	1,094.2	1,420.9	1,552.5	1,542.2	1,459.3	1,170.0	907.4	761.9	654.1	610.5	12,627.4
Total Replacement Credits		630.9	866.6	1,130.0	1,460.2	1,597.3	1,589.2	1,501.8	1,206.3	934.8	781.5	673.3	629.5	13,001.4
Excess Replacement Credits		15.9	27.0	35.8	39.2	44.8	47.0	42.5	36.4	27.5	19.6	19.2	19.0	373.9

BEST AVAILABLE COPY

APPENDIX

Exhibit 9:

Colorado Exhibit 1267, App. A, Letter dated March 26, 1999, from Office of the State Engineer, State of Colorado, approving LAWMA's 1999 Replacement Plan.

STATE OF COLORADO

OFFICE OF THE STATE ENGINEER
Division of Water Resources
Department of Natural Resources

[SEAL]

[Names and Addresses Omitted in Printing]

Don Higbee
Lower Arkansas Water Management Association
PO Box 1161
Lamar, CO 81052

James E. Slattery
Helton & Williamsen, P.C.
384 Inverness Drive South, Suite 144
Englewood, CO 80112

RE: Lower Arkansas Water Management Association
Arkansas River Replacement Plan

Dear Mr. Higbee & Mr. Slattery:

We have reviewed your February 26, 1999 application on behalf of the Lower Arkansas Water Management Association (LAWMA) for an Arkansas River Replacement Plan for the plan year April 1, 1999 through March 31, 2000 pursuant to the **AMENDED RULES AND REGULATIONS GOVERNING THE DIVERSION AND USE OF TRIBUTARY GROUND WATER IN THE ARKANSAS RIVER BASIN, COLORADO** ("Rules") approved in Case No. 95CW211. Based on your application and the subsequent listing of well data verified by you, there are **548 wells** included in this replacement plan, of which **518 wells** will be active for the execution of this plan. A listing of wells covered by this plan is attached at Enclosure 1.

Total pumping by the active wells in this plan is estimated to be **101,924 acre-feet** during the plan year.

Of the total pumping, 83,321 acre-feet will be from irrigation wells producing from the valley-fill and surficial aquifers subject to Rule 3, 10,490 acre-feet will be from wells producing from the valley-fill, and surficial aquifers subject to Rule 4, and 8,113 acre feet will be from wells in other aquifers subject to Rule 5 of the Rules.

The estimate of potential depletions to senior surface water rights in Colorado and depletions to Stateline flow during this plan year is **28,736 acre-feet**. The estimate of potential out-of-priority depletions to senior surface water rights in Colorado and depletions to usable Stateline flow, to be replaced during this plan year, is **19,774 acre-feet** based upon the above pumping estimates, the actual pumping from previous plan years, estimates of depletions including the presumptive depletions given in Rule 4.2 of the Rules, the delayed response of well pumping on the surface streams and the application of the usability factors determined by Larson to estimate depletions to usable Stateline flow as applied in Table 7 of your plan application.

Because 100% of the out-of-priority depletions to senior surface water rights in Colorado will be replaced during this plan year and because depletions to usable Stateline flow have been estimated using the method described in paragraph 5 of the **Resolution Concerning an Offset Account in John Martin Reservoir for Colorado Pumping As Amended March 30, 1998**, no additional quantity has been determined for the replacement of depletions to usable Stateline flow. The effectiveness of this replacement plan in replacing depletions to usable Stateline flow will be evaluated at the end of the plan year to determine if any additional replacements are required to replace depletions to usable Stateline flow

caused by post-compact diversions of ground water pursuant to this plan.

LAWMA proposes to use the following sources of replacement water:

1. Credit for a portion of the releases from the Transit Loss Account attributable to LAWMA replacement plan wells for depletions above the Buffalo Canal headgate. (Estimated to yield 1,300 acre-feet.)

2. Credit from the non-consumptive portion of transit loss of deliveries purchased by LAWMA and delivered to the Offset Account. (Estimated to yield 300 acre-feet.)

3. An allocation of 1,800 acre-feet of Fry-Ark return flow water.

4. Consumptive use credits from 1,323 shares of the Fort Bent Ditch listed in Table 7A of your application. The shares are expected to yield 500 acre-feet.

5. Consumptive use credits from 50 shares of the Lamar Canal obtained by arrangement with the City of Lamar. The shares are expected to yield 40 acre-feet.

6. Excess consumptive use credits from Lamar Canal shares owned by Colorado Beef which Colorado Beef will not use in its Substitute Water Supply Plan. These credits are expected to yield 700 acre-feet.

7. Consumptive use credits from the use of all but 1.5 cfs of the X-Y Canal. These credits are expected to yield 6,208 acre-feet.

8. Consumptive use credits from full use of the Manvel Canal. These credits are expected to yield 2,500 acre-feet.

9. Consumptive use credits from use of the Stubbs portion of the Sisson-Stubbs Ditch. Consumption associated with this right is estimated at 473 acre-feet.

10. Consumptive use credits from the use of 3569 out of 3800 shares of the Highland Canal. These credits are expected to yield 4,625 acre-feet. The consumptive use water will be stored in the Offset Account in John Martin Reservoir.

11. Credit from the non-consumptive portion of transit loss of deliveries to the Offset Account of replacement water from the Highland Canal. (Estimated to yield 275 acre-feet.)

12. Article II Account water in John Martin Reservoir from the X-Y Graham, Manvel, and Stubbs portion of the Sisson-Stubbs ditches. The plan proposal uses 1,000 acre-feet of this water.

13. Treated discharge from the Greystone Consultant's ground water remediation that exceeds the replacement requirement of their substitute water supply plan. These credits are expected to yield 53 acre-feet.

Your projected yield from these replacement sources is 19,774 acre-feet which matches the stream depletions which have been estimated for this plan year. The actual yields from the replacement sources listed above will depend on the actual water availability during this plan year and the application of the conditions of approval listed below.

It is estimated that an additional **14,500 acre-feet** of stream depletions, beyond what will occur during this plan year, will occur after the March 31, 2000 expiration date of this plan due to diversions of ground water during the life of this plan and pumping done under previous plans. Replacement of these depletions is proposed to be accomplished by the commitment of the renewable sources of replacement water listed above.

The State and Division Engineers have reviewed the plan and the adequacy of each source of water provided for use as augmentation water, including, where necessary, the historical consumptive use of each water right, and return flows from diversion of waters imported into the Arkansas River Basin or other fully consumable waters proposed for use as augmentation water. In accordance with Section 25-8-202(7), C.R.S. and Senate Bill 89-181 Rules and Regulations adopted on February 4, 1992, the State Engineer has determined that subject to the terms and conditions below, the replacement supply is of a quality to meet the requirements of use to senior appropriators.

Based on stream depletions determined in accordance with the Rules, and consistent with other provisions of the Rules, the State and Division Engineers have determined that, subject to the terms and conditions set forth below, it appears the plan to divert tributary ground water will provide sufficient augmentation water in amount, time, and location to replace out-of-priority depletions to senior surface water rights in Colorado and all depletions to usable Stateline flow caused by such diversions and may therefore be approved pursuant to Rule 7 of the Rules.

This plan is hereby approved pursuant to the following conditions:

1. The **518 active wells** in this plan shall not divert more than **101,924 acre-feet** of ground water without first obtaining an amendment to the plan. No inactive wells, individual wells with zero estimated pumping, or groups of wells in farm units with zero estimated pumping which are covered by this plan shall be pumped without first obtaining an amendment to the plan. Additional wells may only be included in this plan if an amendment to the plan is obtained. Any request for amendment must include identification of the subject wells, an estimate of the amount of water each well will pump by month, an update of the total stream depletions by reach and month including post-plan depletions, and identification of the source of additional replacement water. Approval of an amendment will be contingent upon the association demonstrating it has sufficient replacement water to cover the additional well depletions. Requests for the emergency activation of wells covered by this plan or the emergency inclusion of new wells may be submitted with information indicating that a valid measurement method is in place and with current information required by Rule 13 of the Rules. Temporary approval for pumping can be made pending a complete request for amendment of the plan which must follow within 30 days of the approval of the emergency request.

2. Under the provisions of the **Resolution Concerning an Offset Account in John Martin Reservoir for Colorado Pumping As Amended March 30, 1998** and the **Stipulation RE Offset Account in John Martin Reservoir** LAWMA will provide the initial 500 acre-foot storage charge into the Offset Account in accordance with

the Resolution. Table 7 of LAWMA's plan application is an acceptable description of the concept of replacement operations with any replacements for depletions to usable Stateline flow made by use of LAWMA's direct flow water rights below John Martin Reservoir or the delivery of water to the Offset Account where it will be available for delivery when requested by Kansas. The actual augmentation credits generated from these various sources are subject to the conditions set forth below.

3. Depletions to usable Stateline flow will be estimated using the method described in paragraph 5 of the **Resolution Concerning an Offset Account in John Martin Reservoir for Colorado Pumping As Amended March 30, 1998.**

4. Water available for in-priority ditch diversions and resulting credits of the X-Y ditch and Manvel canal direct flow water rights will be measured at the Carlton stream gage. LAWMA will need to demonstrate through additional engineering analysis the comparison between the use of the Carlton gage and the Granada gage when data is available for periods when the Buffalo Canal is placing a call.

5. The augmentation credits derived from the use of the water rights listed above as replacement sources will be based on the consumptive use factors and credit limits used for last year's plan, subject to amendment based on further review. All parcels of dried up land used to generate augmentation credits will be inspected during the irrigation season to verify dry up. The final verification of dry up will be in the form of an affidavit signed by an individual having personal knowledge of the dry up for this year's entire irrigation season for each parcel of land

used in the approved replacement plan. All affidavits must be provided to the Division Engineer by November 15, 1999 in order that the final determination of augmentation credits for the irrigation season can be made.

6. The approval of this replacement plan is limited to only that pumping which results in depletions which cause injury that can be replaced by the water provided by this plan on the mainstem of the Arkansas River If a Rule 5 well in this plan causes depletions on a tributary of the Arkansas River, affecting senior surface water rights, where this plan cannot provide replacement water, the well will be subject to curtailment until arrangements are made to provide replacement water at a point which will preclude injury to the calling senior surface water right on the tributary.

7. Water available for augmentation credit resulting from LAWMA's use of the Highland Canal will be measured through an augmentation station returning to the river from the canal. Measurement will be accomplished using an orifice rating table determined from measurements at Wasteway #3. LAWMA's proposal for administration and operation of Highland Canal water rights dated March 11, 1999 is currently being evaluated. Any changes resulting from the evaluation of this proposal will be incorporated into this plan by amendment.

8. The amount of credit from transit loss account releases will be reduced 10% to account for losses not attributable from wells such as evaporation and evapotranspiration. LAWMA can demonstrate through additional engineering analysis what the actual percentage should be for future years.

9. For all water rights used as permanent replacement sources in this plan but not decreed for augmentation use, LAWMA must ensure that an application for a change of water right is filed in Water Court seeking to obtain a decree approving the use of the water right for augmentation use within a reasonable amount of time, but in no case longer than 10 years from the time of first augmentation use, in accordance with Rule 6 of the Rules.

10. Pumping of the alternate point of diversion wells covered by this plan will be reported for both in priority pumping and out of priority pumping on a monthly basis in order to benefit from the amount of pumping which is done in priority.

11. This plan assumes that return flows from deliveries of Fryingpan-Arkansas Project water will be available in amount, time, and location to replace a portion of the out-of-priority depletions to senior surface water rights in Colorado and thereby prevent some depletions to usable Stateline flow. The State and Division Engineers have determined that the estimates of Fry-Ark return flow to be used in this plan are reasonable. If, however, the Fry-Ark return flows prove to be insufficient in amount, time, or location to replace out-of-priority depletions to senior surface water rights in Colorado, LAWMA agrees to either: 1) curtail pumping by its member wells, or 2) obtain additional sources of replacement water as the State and Division Engineers may direct. LAWMA shall confer with the Division Engineer as requested to determine the amount, time, and location of Fry-Ark return flows.

12. Approval of this plan does not guarantee that the amount of replacement water made available pursuant to this plan will replace out-of-priority depletions to senior

surface water rights in Colorado, to the extent required by Rule 11 of the Rules, or depletions to usable Stateline flows caused by post-compact ground water diversions pursuant to the plan; and, notwithstanding approval of this plan, should the plan prove insufficient, each well user covered by the plan shall be responsible for replacement of out-of-priority depletions to senior surface water rights in Colorado to the extent required by Rule 11 of the Rules, and depletions to usable Stateline flows caused by post-compact ground water diversions.

13. The State and Division Engineers shall determine depletions to usable Stateline flow caused by post-compact ground water diversions for irrigation use pursuant to Rule 3.4 of the Rules. To the extent that replacement of out-of-priority depletions to senior surface water rights in Colorado and deliveries of water to the Stateline pursuant to the plan are not sufficient to replace all depletions to usable Stateline flow caused by post-compact ground water diversions for irrigation use, the State and Division Engineers will allocate all unreplaced depletions to usable Stateline flow caused by post-compact ground water diversions for irrigation use to well users in this plan to replace additional depletions to usable Stateline flow. LAWMA agrees to provide any additional replacement water necessary to replace depletions to usable Stateline flow caused by post-compact ground water diversions for irrigation by its members as determined by the State and Division Engineers in accordance with Rule 3.4 of the Rules.

14. LAWMA agrees to replace out-of-priority depletions to senior surface water rights in Colorado and depletions to usable Stateline flows occurring after the expiration date of the plan (March 31, 2000) which are caused by diversions of ground water during the life of the plan by

committing its renewable sources of replacement water for this purpose.

15. LAWMA will provide data to the Division Engineer's office, or other entity designated by the State Engineer, in a standard format designated by the State or Division Engineer, and at such times as are necessary to ensure timely computations to determine compliance of the LAWMA's member wells. Accounting must include all information requested, including but not limited to pumping by member wells, and deliveries of replacement water. Specifically, both owner/user supplied pumping data and replacement operations data for the previous month must be provided to the Division Engineer by no later than the 10th of each month. Reports of pumping by individual wells which are not in compliance with the provisions of the approved plan must be submitted as they are detected.

16. LAWMA must monitor its member wells so as to be able to verify their compliance with the plan. Should any well user be out of compliance with the plan, LAWMA must notify the State and Division Engineers of that fact as provided for in Rule 10 of the Rules. In particular, LAWMA will monitor the overall performance of this replacement plan by comparing the wellhead depletions corresponding to the projected annual pumping with the actual depletions from reported pumping for each well or farm unit in the plan. Action will be taken if the total pumping by a well user covered by the plan is about to exceed the total amount of projected pumping. Options for appropriate actions are to:

a) Notify the Division Engineer when a well user's pumping is out of compliance with the terms of the approved plan and request that the Division Engineer stop the well from pumping in excess of its limit.

b) Notify the Division Engineer of the purchase of more replacement water, in addition to the water already purchased for the plan, to cover the additional depletions caused by any additional pumping by the well or wells in question.

c) Notify the Division Engineer of a reallocation of the replacement water already purchased or otherwise available to the plan. Indicate to the Division Engineer which wells covered by the plan will pump less than originally planned or alternatively demonstrate that existing replacement sources will make available sufficient quantities to allow additional pumping by the well or wells in question.

17. In accordance with amendments to Section 25-8-202-(7), C.R.S. and "Senate Bill 89-181 Rules and Regulations" adopted on February 4, 1992, the State Engineer shall continue to determine whether or not the replacement supply is of a quality to meet requirements of use to senior appropriators. As such, water quality data or analysis may be requested at any time to determine if the water quality is appropriate for downstream water users.

18. No change or improvement of the delivery or application method of water from member wells may be made which would result in material depletion of usable quantity or availability for use of water to users in Colorado and Kansas in violation of Paragraph D, Article IV, of the Arkansas River Compact.

19. **From preliminary snowpack measurements, it appears that runoff for the 1999 irrigation year may be below average. As a result, the yield of some replacement supplies may be less than estimated. However, with the commitment of at least 24,121 acre-feet of water in LAWMA's Article II accounts,**

there should be sufficient resources to provide replacements for the predicted stream depletions for the 1999 plan year. Therefore, I encourage LAWMA to carefully monitor pumping by its member wells and to implement the measures described in condition 16 as required.

20. Acceptance of these conditions must be made in writing to the Division Engineer (310 East Abriendo, Suite B, Pueblo CO 81004, FAX (719) 544-0800) by 5:00 p.m., March 31, 1999. The name, address, and phone number of a contact person who will be responsible for the operation and accounting of this plan must be provided with the acceptance.

I want to thank you for your cooperation and compliance with the amended rules during the past year and for your continued cooperation and compliance in the future. Your efforts are greatly appreciated. I would like to also remind you that you must comply with the Measurement Rules. If you have any questions do not hesitate to contact any of my staff in Denver or Pueblo.

Sincerely,

/s/ Hal D. Simpson
Hal D. Simpson
State Engineer

1 Enclosure

cc: Steve Witte Division Engineer
David W. Robbins, Hill & Robbins
John B. Draper, Montgomery & Andrews
Dale E. Book, Spronk Water Engineers

APPENDIX

Exhibit 10:

Kansas Exhibit 1093, Table 14, Predicted Depletions to Stateline Flow, Revised Kansas H-I model (1997-1999).

Table 14

Predicted Depletions to Stateline Flow
Revised Kansas H-I Model
(1997-1999)

	Run ID	Flags
Base Condition:	**C03**	**HHHH**
Test Condition:	**C04**	**CHH0**

Monthly Results

Year	Mo	Predicted Stateline Flow			Usable Stateline Flow			Usable	
		HHHH	CHH0	Depletion or (Accretion)	HHHH	CHH0	Depletion or (Accretion)	Dep or (Acr) w/seas lmt	Seasonal Dep & Accr
1997	1	8,086	10,096	2,011	2,822	3,524	702	702	
1997	2	7,884	9,666	1,783	2,751	3,374	622	622	
1997	3	5,668	7,058	1,390	1,978	2,463	485	485	1,809
1997	4	9,983	10,308	325	8,176	8,442	266	266	
1997	5	14,237	14,538	301	11,660	11,906	247	247	
1997	6	96,499	65,820	-30,680	39,553	36,516	-3,037	-3,037	
1997	7	35,000	35,000	0	28,665	28,665	0	0	
1997	8	49,755	33,203	-16,552	34,926	27,193	-7,733	-292	
1997	9	21,000	21,000	0	17,199	17,199	0	0	
1997	10	21,951	25,391	3,440	17,978	20,795	2,817	2,817	0
1997	11	7,757	10,127	2,369	2,707	3,534	827	827	
1997	12	12,952	19,061	6,109	4,520	6,652	2,132	2,132	
1998	1	19,101	21,492	2,391	6,666	7,501	834	834	
1998	2	17,381	19,545	2,164	6,066	6,821	755	755	
1998	3	28,794	29,301	508	10,049	10,226	177	177	4,725
1998	4	21,819	17,350	-4,469	17,869	14,210	-3,660	-2,935	
1998	5	9,434	10,009	575	7,727	8,198	471	471	
1998	6	13,907	16,392	2,485	11,390	13,425	2,035	2,035	
1998	7	44,823	44,704	-119	34,437	34,426	-12	0	
1998	8	26,323	26,168	-156	21,559	21,431	-127	0	
1998	9	21,000	21,000	0	17,199	17,199	0	0	
1998	10	21,175	21,699	523	17,343	17,771	428	428	0
1998	11	10,192	12,495	2,303	3,557	4,361	804	804	
1998	12	9,994	12,012	2,018	3,488	4,192	704	704	
1999	1	19,351	16,649	-2,702	6,753	5,810	-943	-943	
1999	2	16,570	18,034	1,464	5,783	6,294	511	511	
1999	3	16,054	16,862	808	5,603	5,885	282	282	1,358
1999	4	21,225	20,772	-453	17,384	17,013	-371	-371	
1999	5	167,459	151,243	-16,216	46,578	44,973	-1,605	-709	
1999	6	73,273	67,808	-5,466	37,254	36,713	-541	0	
1999	7	37,969	37,042	-927	31,097	30,337	-760	0	
1999	8	78,137	69,029	-9,108	37,736	36,834	-902	0	
1999	9	21,000	21,000	0	9,459	10,453	994	994	
1999	10	18,810	19,677	866	1,862	1,948	86	86	0
1999	11	9,850	11,571	1,721	3,438	4,038	601	601	
1999	12	19,266	19,530	263	6,724	6,816	92	92	693
Calendar Year Totals									
1997		290,773	261,267	-29,506	172,937	170,264	-2,673	4,768	1,809
1998		243,943	252,165	8,223	157,350	159,760	2,410	3,274	4,725
1999		498,964	469,215	-29,749	209,670	207,114	-2,556	543	2,050
Total		1,033,679	982,647	-51,032	539,956	537,137	-2,819	8,585	**8,585**
							1997 Offset Account Credit:		1,935
							Remaining Depletions to Usable Stateline Flows:		**6,650**

APPENDIX

Exhibit 11:

Kansas Exhibit 1122, Amendments to Rules Governing the Measurement of Tributary Ground Water Diversions Located in the Arkansas River Basin.

AMENDMENTS TO RULES GOVERNING THE MEASUREMENT OF TRIBUTARY GROUND WATER DIVERSIONS LOCATED IN THE ARKANSAS RIVER BASIN

AUTHORIZATION

In order for the State Engineer and Division Engineer for Water Division 2 to properly administer the waters of the Arkansas River basin and to comply with the Arkansas River Compact, it has become necessary to adopt amendments to the rules governing the measurement of tributary ground water diversions located in the Arkansas River Basin. The State Engineer's authority to promulgate the amendments to these rules is based on section 37-80-104, C.R.S., which requires the State Engineer to make and enforce such regulations with respect to deliveries of water as will enable the state of Colorado to meet its compact commitments; section 37-92-501, C.R.S., which authorizes the State Engineer to adopt rules and regulations to assist in the performance of the administration, distribution and regulation of the waters of the state in accordance with the constitution of the state of Colorado, the provisions of Article 92 (The Water Rights Determination and Administration Act of 1969) and other applicable laws; and section 37-92-502(5), C.R.S., which authorizes the State Engineer to order any owner or user of a water right to install and maintain at such owner's or user's expense necessary meters, gauges, or other measuring devices and to report at reasonable times to the appropriate Division Engineer the readings of such meters, gauges or other measuring devices.

ORDER OF THE STATE ENGINEER

IT IS ORDERED that the following rules and amendments to the rules governing the measurement of tributary ground water diversions located in the Arkansas River Basin are adopted by the State Engineer.

Rule 1. **Scope**. These rules are applicable to all wells located in the Arkansas River basin **except** decreed and/or permitted wells as described in section 37-92-602, C.R.S.; wells located within a designated ground water basin; decreed and/or permitted nontributary well; permitted wells subject to sections 37-90-137(4), C.R.S.; and wells permitted and decreed for not more than 50 gallons per minute that are part of a judicially approved plan for augmentation.

Rule 2. Definitions:

A. The following definitions are applicable to these rules governing the measurement of tributary ground water diversion located in the Arkansas River basin:

1. **"Compound system"** means a system where more than one electrical device is operated from the same electrical power meter.

2. **"Complex system"** means any system where the total dynamic head at the pump will vary due to multiple discharge locations in a pipeline, or where the method of delivery will vary between open discharge, gated pipe, or sprinkler system during a single irrigation season, or where multiple wells discharge into a common pipeline.

3. **"Inactive well"** means any well that is not in use and is disconnected from a power source.

4. **"Power coefficient"** means the amount of electrical energy expressed as kilowatt hours (KWH) consumed in pumping one acre-foot of water.

5. **"Tributary well(s)"** are those wells that produce underground water and ground water as defined in section 37-92-103(11), C.R.S.

B. Any other term used in these rules that is defined in Article 90 or 92 is used with the meaning given therein.

Rule 3. All wells within the scope of these rules shall either, **by July 15, 1994**, be equipped with a totalizing flow meter that is installed and maintained according to manufacturer's specifications and recommendations or, **by October 1, 1994**, be rated to determine a power coefficient.

3.1

3.1.1 When a totalizing flow meter is used, it shall be the owner's responsibility to keep the meter in acceptable operating condition. Any meter designed and manufactured for the purpose of measuring the flow of water, and which has a totalizing feature, shall be considered to be acceptable for purposes of these rules. The State Engineer may adopt standards and specifications for the installation, calibration, testing, repair, and maintenance of meters. An installed flow meter shall be determined to be in accurate operating condition when the indicated flow of the meter is within plus or minus 5% of an independent field measurement made using calibrated test equipment. Recalibration may be required by the Division Engineer if the Division Engineer determines an error was made.

3.1.2 As a minimum, totalizing flow meters shall be: properly verified in the field to be in accurate working condition under the supervision of an individual or entity approved annually by the State Engineer to do such tests when installed; contain sufficient recording digits to assure that "roll over" to zero does not occur within three years; and shall be maintained by the well owner so as to provide a continuous, accurate record of withdrawals. If the meter is not operational, the well shall not be pumped unless a working meter is installed or unless a specific backup water measurement program approved by the State Engineer is put into effect. Totalizing flow meters are required to be re-verified in the field to be in accurate working condition under the supervision of an individual or entity annually approved by the State Engineer every four years after the date of original installation and flow meters in existence as of **July 5, 1994**, shall be certified to be in accurate working condition under the supervision of an individual or entity annually approved by the State Engineer by June 15, 1995, and re-verified to be in accurate working condition every four years thereafter. The Division Engineer shall be notified in writing of the date and person performing the re-verification.

3.2 The State Engineer may adopt standards and specifications for power coefficient testing. As a minimum, power coefficients shall: be determined utilizing rating procedures approved by the State Engineer and conducted under the supervision of an individual or entity annually approved by the State Engineer to do such tests; be conducted when the pumping system has stabilized, i.e., both operating pressure and pumping drawdown has not changed more than 10% in the last hour; have been determined on or after April 1, 1992; include the pumping

drawdown and operating pressure at the time the test was conducted; and be updated through re-rating at least every four years. The Division Engineer shall be notified in writing of the date and person performing the re-rating.

3.3 If the well(s) are part of a complex or compound system, or if the pump is driven by internal combustion means, the owner or user of the well must utilize the totalizing flow meter method (Rules 3.1.1 and 3.1.2), unless the provisions of Rule 3.6 are applicable.

3.4 All flow measuring equipment utilized in verification of accuracy and working condition in the field and/or rating of wells must be calibrated bi-annually to be accurate within plus or minus 2%, unless a variance is granted by the Division Engineer.

3.5 Re-rating of power coefficients shall be required more frequently than every 4 years if any of the following occur:

3.5.1 A new or re-worked pump and/or motor is installed on the well.

3.5.2 The well is re-worked to change the yield of the well.

3.5.3 The system that the pump discharges into is modified in such a manner as to change the power coefficient or the discharge of the pump.

3.5.4 Any other alteration to the system which changes the discharge of the pump or power coefficient.

3.5.5 Additional tests may also be required if the Division Engineer conducts or reviews tests and determines an error was made.

3.6 Owners and/or users of wells within the scope of these rules who use the power coefficient method and whose well

discharges into a pressurized pipeline system with more than one point of discharge during a normal irrigation season must submit two Power Consumption Coefficient (PCC) measurements as required under the scope of these rules. One measurement must be taken under maximum head (minimum yield) and one measurement must be conducted under minimum head (maximum yield) conditions. A registered professional engineer, or a person approved upon written request to the State Engineer, must annually evaluate the range of pumping conditions and provide an analysis which determines the representative condition and PCC for that condition. This analysis must be provided within 30 days of the initiation of pumping for that year. If the Division Engineer determines that the operation of the well does not agree with the representative condition, the lower PCC will be used to compute pumping volumes.

Rule 4. All owners of wells within the scope of these rules who choose to install totalizing flow meters shall provide notice in writing to the Division Engineer for Water Division No. 2 by **July 15, 1994**, stating: the name and address of the owner of the well(s); the name and address of the user of the well(s) (if different than the owner); the well permit number(s); the decree or case number(s); the legal description of the location of the well(s); the meter manufacturer; the meter model number; the meter size; the meter serial number(s); the volumetric units (gallons or acre-feet); the name of power utility company and power company account number (if applicable); the kilowatt hour meter reading on the date of installation (if applicable); the beginning totalizing flow meter reading; and the date of installation. Notification to the Division Engineer shall

be on a form prescribed by the State Engineer. The Division Engineer shall be notified of any method of well measurement changes on a form prescribed by the State Engineer.

Rule 5. All owners of wells within the scope of these rules who choose to utilize the power coefficient method shall provide notice in writing to the Division Engineer for Water Division No. 2 by **October 1, 1994**, stating: the name and address of the owner of the well(s); the name and address of the user of the well(s) (if different than the owner); the well permit number(s); the decree or case number(s); the legal description of the location of the well(s); the power meter serial number(s); the utility company name; the power company account number; the power coefficient; the date of power coefficient rating; the kilowatt hour meter reading on the date of the power coefficient rating; the name and address of the State Engineer approved individual or entity supervising the power coefficient rating; the current transformer (C.T.) factor, if applicable; and the potential transformer (P.T.) factor, if applicable. Notification to the Division Engineer shall be on a form prescribed by the State Engineer. The Division Engineer shall be notified of any method of changes on a form prescribed by the State Engineer.

Rule 6.

6.1 Data as to monthly amounts of water pumped from wells within the scope of these rules shall be for the period of November 1, to October 31, (coinciding with the Arkansas River compact year) and shall be filed with the Division Engineer no later than **January 31, 1995 and every consecutive year thereafter**. The submission of data as to the amounts diverted by any well(s) in conformance

with the requirements of the Amended Rules and Regulations for the Diversion and Use of Tributary Ground Water in the Arkansas River basin shall be deemed sufficient to satisfy the requirements of this rule for such well(s) **after January 31, 1997**.

6.2 For the year 1994, owners utilizing the power coefficient method shall calculate the amount of water pumped using monthly power records for the period of November 1, 1993 through October 31, 1994.

6.3 Data shall be submitted on forms prescribed by the State Engineer. Such forms shall also include a consent to release power data to the Division Engineer. If a well user or owner's power account number changes for any reason, the user or owner must notify the Division Engineer of the new account number on a form prescribed by the Division Engineer within 45 days following the change.

Rule 7. Inactive wells.

7.1.1 Inactive wells are excluded from these rules provided a sworn affidavit is filed with the Division Engineer by July 15, 1994 and March 1, every consecutive year thereafter, stating the status of the well as inactive. However, after March 1, 1996, inactive wells are excluded from these rules provided a sworn affidavit is filed with the Division Engineer within 30 days after the well has become inactive. Such sworn affidavit shall state that the well is inactive and shall include: the name and address of the owner of the well(s); the name and address of the user of the well(s), if different than the owner; the well permit number(s); the decree or case number(s); the legal description of the location of the well(s); and a statement that the well(s) are disconnected from any power source. If the well

owner desires to have the power to the well remain connected for any reason, approval of such must be first obtained from the State Engineer pursuant to Rule 11. Should the well(s) become active at any time, all aspects of these rules are immediately in effect. Notification to the Division Engineer shall be on a form prescribed by the State Engineer.

7.1.2 Once a sworn inactive well affidavit is filed with the Division Engineer, no further filings are required unless the owner or user wishes to remove the well from inactive status. When an owner or user desires to change the well back to active status, notification to the Division Engineer is immediately required. No operation of the well can occur until such notification and compliance with all State Engineer rules and regulations has taken place.

Rule 8. No water shall be withdrawn from any well not in compliance with these rules except to determine a power coefficient or to install a totalizing flow meter.

Rule 9. Failure to comply with any of these rules will subject the well owner and/or user to court proceedings and the state's costs, including reasonable attorneys fees, associated with enforcement of these rules pursuant to section 37-92-503, C.R.S. Prior to filing any court action, the Division Engineer shall notify the well owner of the violation in writing and shall advise the well owner of the date by which the violation must be corrected to avoid court proceedings, which date shall be at least ten days following the mailing of the notice to the well owner or personal service on the well owner.

Rule 10. If any portion of these rules is found to be invalid, the remaining portion of the rules shall remain in force and unaffected.

Rule 11. When the strict application of any provisions of these rules would cause unusual hardship, the State Engineer may grant a variance for a specific instance provided a written request for the variance is made to the State Engineer and the State Engineer finds the request justifiable.

IT IS FURTHER ORDERED that these amended rules shall become effective on the 29th day of February, 1996, and shall remain in effect until amended as provided by law. Any person desiring to protest these rules may do so in the manner provided in section 37-92-501, C.R.S. Any such protest to these rules must be filed by the end of the month following the month in which these rules are published.

Dated this 26th day of February, 1996.

/s/ H. D. Simpson
Hal D. Simpson
State Engineer

APPENDIX

Exhibit 12:

Kansas Exhibit 1113, Analysis of HIM Output for Diversions, Revised Kansas H-I Model.

ANALYSIS OF HIM OUTPUT FOR DIVERSIONS

Revised Kansas HIM (1/02)

1950-99	Upstream			Downstream			Total		
Total	Obs	Pred	Pred/Obs	Obs	Pred	Pred/Obs	Obs	Pred	Pred/Obs
1950	633,027	628,864	99.3%	213,488	198,861	93.1%	846,515	827,725	97.8%
1951	699,296	681,284	97.4%	190,609	148,749	78.0%	889,905	830,033	93.3%
1952	773,704	807,925	104.4%	179,314	179,191	99.9%	953,018	987,116	103.6%
1953	609,967	655,477	107.5%	147,525	166,358	112.8%	757,492	821,835	108.5%
1954	374,193	421,647	112.7%	98,371	140,722	143.1%	472,564	562,369	119.0%
1955	533,628	600,791	112.6%	193,916	228,863	118.0%	727,544	829,654	114.0%
1956	484,381	525,591	108.5%	125,712	131,061	104.3%	610,093	656,652	107.6%
1957	1,221,504	1,238,456	101.4%	179,522	169,191	94.2%	1,401,026	1,407,647	100.5%
1958	832,065	883,186	106.1%	194,783	197,934	101.6%	1,026,848	1,081,120	105.3%
1959	652,588	728,997	111.7%	222,886	180,984	81.2%	875,474	909,981	103.9%
1960	661,530	765,849	115.8%	116,630	184,725	158.4%	778,160	950,574	122.2%
1961	790,325	893,480	113.1%	162,378	139,895	86.2%	952,703	1,033,375	108.5%
1962	879,209	932,225	106.0%	159,684	137,996	86.4%	1,038,893	1,070,221	103.0%
1963	467,737	506,467	108.3%	92,240	129,478	140.4%	559,977	635,945	113.6%
1964	489,338	520,179	106.3%	58,216	78,385	134.6%	547,554	598,564	109.3%
1965	950,915	1,072,196	112.8%	162,945	146,820	90.1%	1,113,860	1,219,016	109.4%
1966	648,219	732,329	113.0%	197,349	160,332	81.2%	845,568	892,661	105.6%
1967	659,876	657,349	99.6%	207,699	147,817	71.2%	867,575	805,166	92.8%
1968	724,633	846,177	116.8%	151,938	165,333	108.8%	876,571	1,011,510	115.4%
1969	849,960	903,923	106.3%	115,154	141,645	123.0%	965,114	1,045,568	108.3%
1970	1,027,315	1,081,394	105.3%	202,502	165,642	81.8%	1,229,817	1,247,036	101.4%
1971	735,173	789,642	107.4%	166,213	145,936	87.8%	901,386	935,578	103.8%
1972	621,684	700,401	112.7%	135,959	143,588	105.6%	757,643	843,989	111.4%
1973	926,438	979,131	105.7%	151,448	170,438	112.5%	1,077,886	1,149,569	106.7%
1974	536,321	610,637	113.9%	94,731	115,167	121.6%	631,052	725,804	115.0%
1975	641,212	705,989	110.1%	108,231	108,811	100.5%	749,443	814,800	108.7%
1976	525,274	600,523	114.3%	91,812	120,235	131.0%	617,086	720,758	116.8%
1977	357,273	400,350	112.1%	71,394	82,232	115.2%	428,667	482,582	112.6%
1978	490,054	524,514	107.0%	79,981	68,268	85.4%	570,035	592,782	104.0%
1979	727,543	760,561	104.5%	121,041	142,478	117.7%	848,584	903,039	106.4%
1980	936,615	951,963	101.6%	184,530	234,092	126.9%	1,121,145	1,186,055	105.8%
1981	506,966	489,435	96.5%	151,700	171,455	113.0%	658,666	660,890	100.3%
1982	869,003	839,284	96.6%	193,269	163,285	84.5%	1,062,272	1,002,569	94.4%
1983	1,137,841	1,052,358	92.5%	215,093	239,237	111.2%	1,352,934	1,291,595	95.5%
1984	1,224,044	1,167,676	95.4%	192,250	231,025	120.2%	1,416,294	1,398,701	98.8%
1985	1,191,999	994,207	83.4%	231,315	197,814	85.5%	1,423,314	1,192,021	83.7%
1986	1,010,165	917,503	90.8%	205,538	179,722	87.4%	1,215,703	1,097,225	90.3%
1987	983,497	874,094	88.9%	219,030	219,582	100.3%	1,202,527	1,093,676	90.9%
1988	709,159	671,466	94.7%	227,732	199,721	87.7%	936,891	871,187	93.0%
1989	685,399	632,583	92.3%	150,860	188,755	125.1%	836,259	821,338	98.2%
1990	669,903	612,342	91.4%	181,342	192,987	106.4%	851,245	805,329	94.6%
1991	632,815	628,107	99.3%	162,271	161,664	99.6%	795,086	789,771	99.3%
1992	649,659	616,332	94.9%	198,541	176,934	89.1%	848,200	793,266	93.5%
1993	863,691	805,822	93.3%	217,804	175,343	80.5%	1,081,495	981,165	90.7%
1994	868,450	844,733	97.3%	245,327	211,583	86.2%	1,113,777	1,056,316	94.8%
1995	1,143,739	892,121	78.0%	261,360	198,165	75.8%	1,405,099	1,090,286	77.6%
1996	1,036,929	842,325	81.2%	211,160	161,062	76.3%	1,248,089	1,003,387	80.4%
1997	1,049,882	953,376	90.8%	248,303	180,671	72.8%	1,298,185	1,134,047	87.4%
1998	1,017,579	965,594	94.9%	201,724	210,693	104.4%	1,219,303	1,176,287	96.5%
1999	917,490	956,140	104.2%	205,791	156,720	76.2%	1,123,281	1,028,747	91.6%

APPENDIX

Exhibit 13:

Colorado 1410, Table 3.3a, 3.3b at page 34, Calibration Results for Canals (1950-1994) Using Appropriate Evaluation Criteria.

Table 3.3a Calibration Results for Canals (1950-1994) Using Appropriate Evaluation Criteria

CANALS	Historical Avg. Irr.Seas. Diversion	Model Error in acre-feet and as %						Model Efficiency	Irr. Season
Station	(af)	BIAS	%	MAE	%	RMSE	%	(NS Criterion)	Correlation
Bessemer	52528	38	0%	4593	9%	6008	11%	0.78	0.8847
Booth Orchard	7458	5	0%	347	5%	460	6%	0.99	0.3713
Excelsior	2058	-1	0%	1059	51%	1610	78%	0.35	0.6093
Collier	763	-1	0%	526	69%	703	92%	0.07	0.3349
Colorado	71456	119	0%	10522	15%	15215	21%	0.77	0.8843
Highline	65744	62	0%	6569	10%	9476	14%	0.81	0.9027
Oxford Farmers	21089	3	0%	3671	17%	4313	20%	0.60	0.7729
Otero	5187	11	0%	1273	25%	1773	34%	0.80	0.8941
Catlin	70409	-1	0%	11147	16%	13196	19%	0.60	0.7872
Ft. Lyon	170200	8149	5%	20669	12%	27401	16%	0.88	0.9446
Rocky Ford	35003	-16	0%	3165	9%	3872	11%	-0.40	0.1744
Holbrook	30092	-230	-1%	7039	23%	8987	30%	0.83	0.9110
Las Animas	26691	23	0%	3203	12%	3883	15%	0.59	0.8216
Ft Bent	15275	3	0%	2470	16%	3147	21%	0.46	0.7016
Keese	4652	-5	0%	799	17%	988	21%	0.13	0.4505
Amity	76511	198	0%	13287	17%	16371	21%	0.66	0.8114
Lamar	33014	20	0%	5966	18%	7752	23%	0.49	0.7053
Hyde	1682	4	0%	637	38%	855	51%	0.07	0.4136
Manvel	1194								
XY Graham	7200	16	0%	2189	30%	3009	42%	0.49	0.7027
Buffalo	17443	-4	0%	3049	17%	3823	22%	0.15	0.5150
Sisson	236	-3	-1%	200	85%	340	144%	0.33	0.5734
Ft. Lyon Storage	17881	2360	13%	10072	56%	17545	98%	0.65	0.8943

Table 3.3b Calibration Results for Canals (1950-1994) Using Appropriate Evaluation Criteria

CANALS	Historical Avg. Mon. Diversion	Model Error in acre-feet and as %						Model Efficiency	Monthly
Station	(af)	BIAS	%	MAE	%	RMSE	%	(NS Criterion)	Correlation
Bessemer	5076	3	0%	1096	22%	1774	35%	0.82	0.9117
Booth Orchard	760	0	0%	138	18%	207	27%	0.89	0.8895
Excelsior	193	0	0%	151	78%	318	165%	0.52	0.7206
Collier	65	0	0%	59	90%	142	219%	0.35	0.5988
Colorado	7329	-27	0%	3001	41%	4643	63%	0.69	0.8330
Highline	6704	5	0%	1208	18%	1939	29%	0.87	0.9321
Oxford Farmers	2028	0	0%	558	28%	883	44%	0.79	0.8929
Otero	555	1	0%	366	66%	624	112%	0.58	0.7669
Catlin	7186	0	0%	1804	25%	2478	34%	0.80	0.8961
Ft Lyon	19342	1194	6%	4756	25%	7199	37%	0.80	0.8991
Rocky Ford	3695	-1	0%	820	22%	1063	29%	0.71	0.8523
Holbrook	3358	97	3%	1859	55%	3060	91%	0.59	0.7785
Las Animas	2597	2	0%	585	23%	791	30%	0.85	0.9255
Ft Bent	1329	0	0%	481	36%	737	55%	0.73	0.8582
Keese	418	0	0%	157	38%	218	52%	0.66	0.8228
Amity	6474	17	0%	2585	40%	4144	64%	0.71	0.8475
Lamar	2988	2	0%	1075	36%	1590	53%	0.70	0.8413
Hyde	155	0	0%	99	64%	146	94%	0.30	0.6181
Manvel	109								
XY Graham	643	1	0%	344	53%	538	84%	0.55	0.7552
Buffalo	1617	0	0%	652	40%	865	53%	0.61	0.7994
Sisson	24	0	-1%	36	147%	87	357%	0.12	0.3543
Ft. Lyon Storage	3453	188	5%	2233	65%	5581	162%	0.54	0.7887

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APPENDIX

Exhibit 14:

Colorado Exhibit 1459, illustrative 10-year compliance program.

Year	Depletions Accretions	Total Yr. 10	Total Yr. 11	Total Yr. 12	Total Yr. 13	Total Yr. 14
1	+1	1				
2	+2	3	2			
3	+3	6	5	3		
4	-1	5	4	2	-1	
5	-2	3	2	0	-3	-2
6	+1	4	3	1	-2	-1
7	-2	2	1	-1	-4	-3
8	-1	1	0	-2	-5	-4
9	-2	-1	-2	-4	-7	-6
10	+2	**+1**	0	-2	-5	-4
11	+1		**+1**	-1	-4	-3
12	-2			**-3 +3**	-6	-5
13	+2				**-4 +4**	-3
14	+5					**+2**

Years 13 and 14 reflect payments in years 12 and 13.

APPENDIX

Exhibit 15:

Colorado Exhibit 1407, Pecos River Compact Report of the River Master, Water Year 2001, Accounting Year 2002, Final Report, June 26, 2002.

PECOS RIVER COMPACT

Report of the River Master

Water Year 2001

Accounting Year 2002

Final Report

June 26, 2002

Neil S. Grigg
River Master of the Pecos River
749 S. Lemay, Ste. A3, PMB 330
Fort Collins, Colorado 80524

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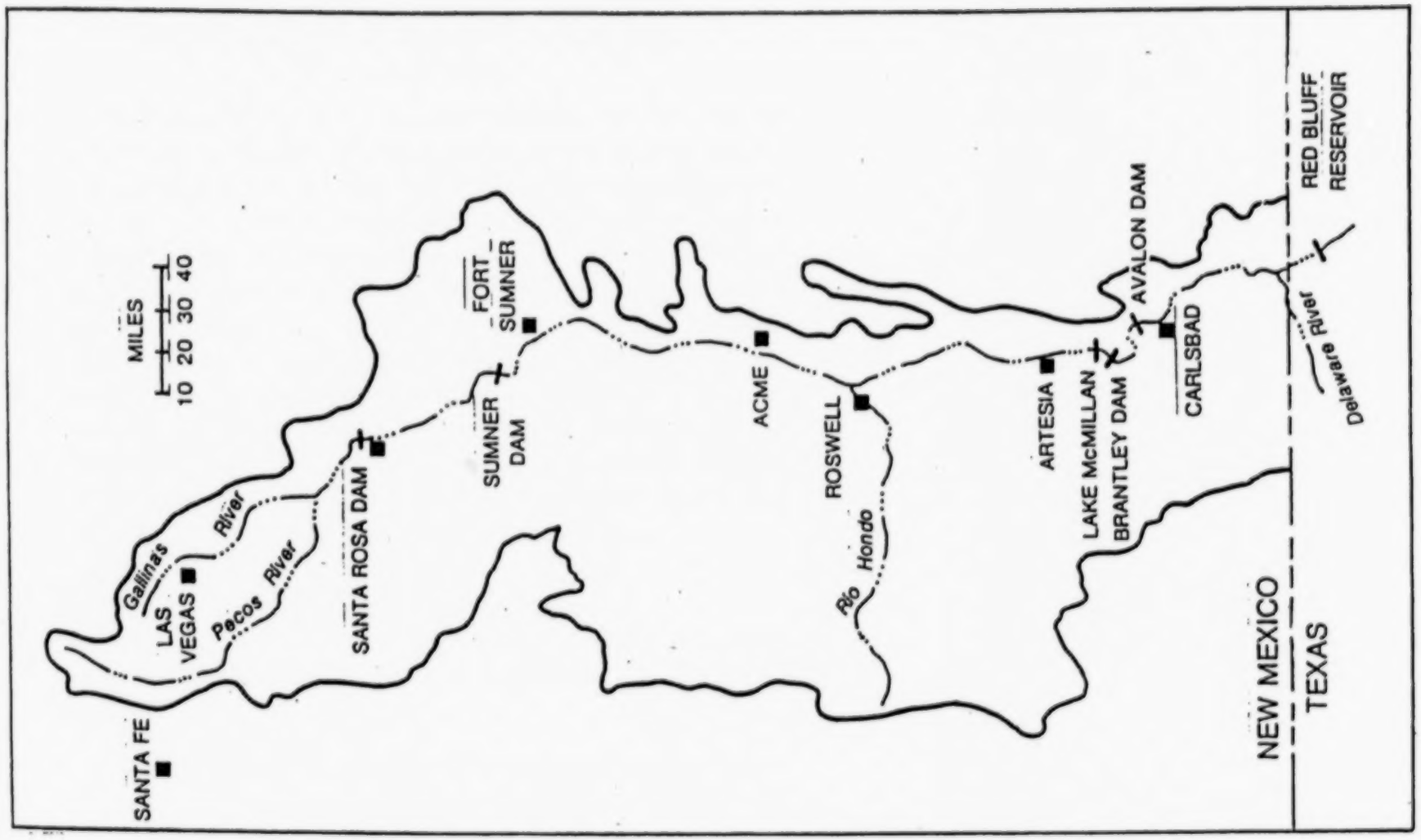
Appendix: Response to States' Objections



Map of Pecos River Basin Showing Accounting Reaches

PECOS RIVER COMPACT
Supreme Court of the United States
No. 65, Original
Amended Decree

Final Report of the River Master
Water Year 2001 – Accounting Year 2002
June 26, 2002

Purpose of the Report. In its Amended Decree issued March 28, 1988 the Supreme Court of the United States appointed a River Master of the Pecos River and directed him to " . . . Deliver to the parties a Preliminary Report setting forth the tentative results of the calculations required by Section III.B.1 of this Decree by May 15 of the accounting year . . . " and to consider " . . . any written objections to the Preliminary Report submitted by the parties prior to June 15 of the accounting year . . . " and to deliver " . . . to the parties a Final Report setting forth the final results of the calculations required by Section III.B.1 of this Decree by July 1 of the accounting year." This is the required Final Report with the determination of:

a. The Article III(a) obligation;

b. Any shortfall or overage, which calculation shall disregard deliveries of water pursuant to an Approved Plan;

c. The net shortfall, if any, after subtracting any overages accumulated in previous years, beginning with water year 1987.

Result of Calculations and Statement of Shortfall or Overage. The results of the calculations in this Final Report show that New Mexico's delivery in Water Year 2001 was a shortfall of 700 acre-feet. The accumulated

overage since the beginning of Water Year 1987 is 9,900 acre-feet.

/s/ Neil S. Grigg
Neil S. Grigg
River Master of the
Pecos River

Pecos River Compact		
Accumulated Shortfall or Overage		
	June 26, 2002	
Water Year	Annual Overage or Shortfall, AF	Accumulated Overage or Shortfall, AF
1987	15,400	15,400
1988	23,600	39,000
1989	2,700	41,700
1990	-14,100	27,600
1991	-16,500	11,100
1992	10,900	22,000
1993	6,600	28,600
1994	5,900	34,500
1995	-14,100	20,400
1996	-6,700	13,700
1997	6,100	19,800
1998	1,700	21,500
1999	1,400	22,900
2000	-12,300	10,600
2001	-700	9,900

Table 1. General Calculation of Annual Departures, TAF, WY 2001			
6/25/02	1999	2000	2001
B.1.a. Index Inflows			
(1) Annual flood inflow			
(a) Gaged flow Pecos R bel Alamogordo Dam	96.8	166.1	114.9
(b) Flood Inflow Alamogordo - Artesia (Table 2)	37.4	-4.9	-13.5
(c) Flood Inflow Artesia - Carlsbad (Table 3)	16.1	8.3	4.1
(d) Flood Inflow Carlsbad - State Line (Table 4)	21.9	4.4	1.2
Total (annual flood inflow)	172.2	173.9	106.7
(2) Index Inflow (3-year avg)			150.9
B.1.b. 1947 Condition Delivery Obligation (Index Outflow)			61.8
B.1.c. Average Historical (Gaged) Outflow			
Gaged Flow Pecos River at Red Bluff NM	75.2	58.2	43.7
Gaged Flow Delaware River nr Red Bluff NM	6.6	1.0	0.3
(1) Total Annual Historical Outflow	81.8	59.2	44.0
(2) Average Historical Outflow (3-yr average)			61.7
B.1.d. Annual Departure			-0.1
C. Adjustments to Computed Departure			
1. Adjustments for Depletions above Alam Dam			
a. Depletions Due to Irrigation (Table 5)	-3.4	0.9	2.3
b. Depl fr Operation of Santa Rosa Reservoir (Table 6)	3.6	2.4	2.8
c. Transfer of Water Use to Upstream of AD	0	0	0
Recomputed Index Inflows			
(1) Annual flood inflow			
(a) Gaged flow Pecos R bel Alamogordo Dam	97.0	169.4	120.0
(b) Flood Inflow Alamogordo - Artesia	37.4	-4.9	-13.5
(c) Flood Inflow Artesia - Carlsbad	16.1	8.3	4.1
(d) Flood Inflow Carlsbad - State Line	21.9	4.4	1.2
Total (annual flood inflow)	172.4	177.2	111.8
Recomputed Index Inflow (3-year avg)			153.8
Recomputed 1947 Condition Del Outflow (Index Outflow)			63.5
Recomputed Annual Departures			-1.8
Credits to New Mexico			
C.2 Depletions Due to McMillan Dike			1.1
C.3 Salvage Water Analysis			0
C.4 Unappropriated Flood Waters			0
C.5 Texas Water Stored in NM Reservoirs			0
C.6 Beneficial C.U. Delaware River Water			0
Final Calculated Departure, TAF			-0.7

Table 2. Determination of Flood Inflows, Alamogordo Dam to Artesia (B.3)

Water Year 2001

6/25/02

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOT
Flow bel Alamog Dam	0.1	0.4	3.3	6.1	46.6	6.5	30.6	6.0	6.8	5.8	0.7	2.1	114.9
FtSumner Irrig Div	0.0	0.0	2.3	5.5	5.8	5.6	5.7	5.7	5.3	4.7	0.0	0.0	40.6
Ft Sumner ID Return	0.9	0.6	1.5	1.7	2.6	2.6	2.6	2.6	2.4	2.1	1.1	0.9	21.5
Flow past FS IDist	0.9	1.1	2.5	2.3	43.3	3.5	27.5	2.9	3.9	3.2	1.7	3.0	95.9
Channel loss	0.1	0.2	0.7	1.4	6.2	1.4	4.4	1.6	1.0	0.9	0.7	0.3	18.8
Residual Flow	0.8	0.9	1.8	0.9	37.1	2.1	23.1	1.3	2.9	2.3	1.1	2.7	77.1
Base Inflow	4.2	3.7	3.5	2.4	2.2	1.7	0.9	1.0	0.7	1.0	2.1	2.4	25.7
River Pump Divers	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.5
Residual, Artesia	4.9	4.6	5.3	3.3	39.2	3.7	23.9	2.2	3.5	3.3	3.2	5.1	102.3
Pecos Flow Artesia	5.7	4.8	7.3	3.6	30.5	6.6	17.8	1.6	1.3	1.8	3.6	4.4	88.7
Flood Inflow, AD-Art	0.7	0.1	2.0	0.3	-8.7	2.9	-6.2	-0.6	-2.2	-1.5	0.4	-0.7	-13.5

Note: Whenever the computed flow past the District is less than the return flow, set the flow past the District equal to the return flow (Manual, B.3.d).

Table 3. Determination of Flood Inflows, Artesia to Carsbad, WY 2001 (B.4)

6/25/02

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOT
Rio Penasco at Dayton	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fourmile Draw nr Lakew	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
South Seven Rivers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rocky Arroyo at Hwy Br	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Flood Inflow, Art-DS3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pecos R at Dam Site 3	1.5	1.6	3.3	13.5	14.5	16.5	12.4	8.5	7.2	6.4	6.6	4.0	96.0
CB Sprgs New Water, T7	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-11.0
Total Inflow, DS3 - CB	0.6	0.7	2.4	12.5	13.6	15.5	11.5	7.6	6.3	5.4	5.7	3.1	85.0
Evap Loss, Lake Avalon, T10	0.2	0.3	0.2	0.5	0.5	0.6	0.6	0.5	0.4	0.4	0.1	0.2	4.4
Storage Chg, Lake Aval, T11	0.5	0.2	-2.2	0.1	0.1	-0.1	0.1	0.0	0.2	0.1	-0.7	0.7	-1.0
Carls ID diversions	0.0	0.0	3.2	11.8	12.1	14.7	11.4	7.1	5.9	5.3	0.0	0.0	71.4
93% CID diver	0.0	0.0	3.0	11.0	11.3	13.6	10.6	6.6	5.5	4.9	0.0	0.0	66.4
Other depletions	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	1.4
Dark Canyon at Csbad	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pecos b Dark Canyon	1.7	2.4	1.4	0.8	0.4	0.4	0.3	0.2	0.2	0.6	6.3	3.1	17.8
Pecos R at Carlsbad	1.7	2.4	1.4	0.8	0.4	0.4	0.3	0.2	0.2	0.6	6.3	3.1	17.8
Total Outflow	2.5	3.1	2.5	12.5	12.3	14.7	11.7	7.5	6.4	6.0	5.9	4.1	89.0
Flood Inflow, DS3-CB	1.9	2.3	0.0	0.0	-1.2	-0.9	0.2	-0.1	0.1	0.6	0.2	1.0	4.0
Flood Inflow, Art-CB	1.9	2.3	0.0	0.0	-1.2	-0.9	0.2	-0.1	0.1	0.6	0.2	1.0	4.1

Table 4. Summary Table for Computations, Carlsbad to State Line - WY 2001				
4/20/02				
	BCB - RB RM	BCB - RB USGS	Del R USGS	DC
Jan	67	0	2	0
Feb	2	0	1	0
Mar	431	286	10.9	0
Apr	82	194	2.4	0
May	0	71	0	0
Jun	40	171	0	0
Jul	54	119	0	0
Aug	48	81	65.5	0
Sep	425	415	3.4	0
Oct	0	39.7	0	0
Nov	0	33.7	0	0
Dec	0	61.5	0	0
Total	1148	1471.9	85.2	0
Summary of flood inflows, Carlsbad to State Line, TAF				
Red Bluff - Carlsbad + Dark C RM calcs)				1.1
Delaware River (USGS Computation				0.1
Total Flood Inflow, Carlsbad to State Line				1.2

Table 5. Depletions Due to Irrigation Above Alamogordo Dam - WY 2001 (C.1.a)								
4/20/02								
	APR	MAY	JUN	JUL	AUG	SEPT	OCT	TOTAL
Precip Las Vegas FAA AP	0.21	0.89	2.08	1.38	2.02	0.44	0.32	7.34
Eff prec Las Veg FAA AP	0.21	0.86	1.89	1.30	1.85	0.43	0.31	6.85
Precip Pecos Natl Monument	0.67	0.74	1.18	2.05	4.71	0.50	0.02	9.87
Eff Precip Pecos RS	0.65	0.72	1.13	1.87	3.69	0.49	0.02	8.57
Precip Santa Rosa	0.28	1.22	3.09	0.66	1.27	1.16	0.35	8.03
Eff Precip Santa Ro	0.27	1.17	2.65	0.64	1.21	1.11	0.34	7.39
Average eff precip, ft	0.03	0.08	0.16	0.11	0.19	0.06	0.02	0.63
Consumptive use, ft	0.19	0.36	0.36	0.30	0.27	0.18	0.11	1.77
CU less eff precip, ft	0.16	0.28	0.20	0.19	0.08	0.12	0.09	1.14
Acres (most recent inventory)	11529							
Streamflow depletion, AF	13101							
1947 depletion, AF	10804							
Difference, TAF	-2.3							
Adjustment to Gaged Flow - Pecos River below Alamogordo Dam =						2.3		

Table 6. Depletions Due to Santa Rosa Reservoir Operations - WY 2001 - (C.1.b)

6/25/02

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
LS 1989 tables used Jan-Oct; 2001 table used Nov-Dec.													
Lk Sumner ga ht, avg	56.05	57.90	59.51	59.08	54.96	41.88	42.14	41.46	36.95	32.99	37.84	43.37	47.01
LS content, AF, avg	31151	35563	39693	38563	28720	9095	9331	8745	5605	3618	5234	8814	
LS area, acres, avg	2288	2481	2650	2605	2172	896	921	855	582	433	528	807	
LS evap, inches	1.86	3.71	4.04	12.49	11.21	14.30	15.10	11.83	10.25	7.00	2.44	3.03	97.26
.77 LS Evap	1.43	2.86	3.11	9.62	8.63	11.01	11.63	9.11	7.89	5.39	1.88	2.33	74.89
LS Precip, inches	0.73	0.65	1.27	0.03	0.65	0.97	0.61	0.99	0.77	0.34	1.08	0.08	8.17
Net LS Evap, inches	0.70	2.21	1.84	9.59	7.98	10.04	11.02	8.12	7.12	5.05	0.80	2.25	66.72
LSum Evaploss, TAF	0.13	0.46	0.41	2.08	1.44	0.75	0.85	0.58	0.35	0.18	0.04	0.15	7.41
L S Rosa ga ht, avg	4.87	6.58	10.76	17.31	20.65	21.08	2.40	96.37	4.96	6.98	5.98	7.61	17.13
LSR content, AF, avg	13203	14661	18857	27339	32753	33508	11241	7317	13277	15025	14134	15619	
LSR area, acres, avg	825	899	1101	1491	1745	1771	753	534	827	931	853	960	
LSR evap, inches	3.72	4.98	7.12	9.12	8.93	12.58	12.38	9.39	7.96	6.49	4.13	3.76	90.56
.77 LSR Evap	2.86	3.83	5.48	7.02	6.88	9.69	9.53	7.23	6.13	5.00	3.18	2.90	69.73
LSR precip, inches	1.57	1.03	1.71	0.25	1.29	2.00	0.57	2.60	1.59	0.39	1.60	0.20	14.80
Net LSR Evap, inches	1.29	2.80	3.77	6.77	5.59	7.69	8.96	4.63	4.54	4.61	1.58	2.70	54.93
LSR Evaploss, TAF	0.09	0.21	0.35	0.84	0.81	1.13	0.56	0.21	0.31	0.36	0.11	0.22	5.20
Total evaploss, TAF	0.22	0.67	0.75	2.92	2.26	1.88	1.41	0.78	0.66	0.54	0.15	0.37	12.61
Sum contents, AF	44354	50224	58550	65902	61473	42603	20572	16062	18882	18643	19368	24433	
1947 area, acres	2042	2254	2690	2880	2801	1998	1094	978	1021	1011	1042	1299	
1947 evaploss, TAF	0.12	0.41	0.41	2.30	1.86	1.67	1.00	0.66	0.61	0.43	0.07	0.24	9.79
current-1947evaploss	0.10	0.25	0.34	0.62	0.39	0.21	0.40	0.12	0.05	0.11	0.08	0.12	2.82
						Annual adjustment for excess evaporation =							2.8

ADJUSTMENT FOR EXCESSIVE STORAGE IN SANTA ROSA RESERVOIR

			2000 Gage	2000 Storage	2001 Gage	2001 Storage
EndYear Sumner Sto			4254.91	28612	4244.92	10158
EndYear S R Sto			4704.22	12670	4707.98	15977
Sum				41282		26135
Sto Adjustment, AF						0
Adjustm Ex Evap, TAF						2.8
Total Adjustment,TAF						2.8

Table 7. Carlsbad Springs New Water WY 2001 - (B.4.c)			
6/25/02			
	TAF	cfs	Totals
Pecos R bel DC, cfs	17.8	24.6	24.6
Dark Canyon, cfs	0	0.0	0.0
Pecos R bel Lake Av,	9.6	13.3	13.3
Depletion, cfs			2.0
CID lag seep, cfs (Table 8)			7.1
Return flow, cfs			1.0
Lake Av lagged seep, cfs (Table 9)			17.4
PR seepage, cfs			3.0
Carls new water, cfs			-15.2
Carls new wat, TAF			-11.0
Carls new wat monthly, TAF			-0.9

Table 8. Carlsbad Main Canal Seepage Lagged - WY 2001 - [B.4.c.(1)(e)]													
6/25/02	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
WY 2001													
CID, TAF	0.0	0.0	3.2	11.8	12.1	14.7	11.4	7.1	5.9	5.3	0.0	0.0	71.4
days/mo	31	28	31	30	31	30	31	31	30	31	30	31	365
cfs	0.0	0.0	51.7	198.6	196.9	246.5	184.9	115.0	99.0	85.5	0.0	0.0	98.2
cfs, qtr avg			17.8			213.9			133.3			28.8	
2000		1Q	2Q	3Q	4Q								
FLOWS, cfs				198.6	33.6								
SEVEN %				13.9	2.4								
2001		1Q	2Q	3Q	4Q								
FLOWS, cfs		17.8	213.9	133.3	28.8								
SEVEN %		1.2	15.0	9.3	2.0								
LAG		3.7	8.3	9.9	6.6	Avg =	7.1	cfs					

Table 9. Lake Avalon Leakage Lagged - WY 2001 - B.4.c.(1)(g)													
6/25/02													
WY 2001	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOT
WS NM rept	75.44	75.91	73.30	73.06	73.09	72.91	73.16	73.19	73.20	73.44	73.50	72.10	
ga ht, avg*	18.44	18.91	16.30	16.06	16.09	15.91	16.16	16.19	16.20	16.44	16.50	15.10	
cfs	26.1	28.4	15.9	14.8	14.9	14.0	15.2	15.4	15.4	16.6	16.9	10.2	
days	31	28	31	30	31	30	31	31	30	31	30	31	365
cfs avg	23.3			14.6			15.4			14.5			16.9
2000		1Q	2Q	3Q	4Q								
cfs				15.2	18.7								
2001		1Q	2Q	3Q	4Q								
cfs		23.3	14.6	15.4	14.5								
lag cfs		20.4	18.2	16.4	14.8	Avg =	17.4	cfs					
* Computed as WS elev by NM Report minus Gage datum at 3257.0 (USBR datum)													

Table 10. Evaporation Loss at Lake Avalon - WY 2001 - (B.4.f)													
4/20/02													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOT
Av WS NM Rept	75.44	75.91	73.30	73.06	73.09	72.91	73.16	73.19	73.20	73.44	73.50	72.10	
Avalon ga ht, avg, ft*	18.44	18.91	16.30	16.06	16.09	15.91	16.16	16.19	16.20	16.44	16.50	15.10	
Avg area Avalon, ac.	768	815	630	616	617	607	622	623	624	638	642	562	
Panevap Brantley, in.	4.65	5.60	6.09	12.74	13.28	16.85	16.90	13.11	11.42	9.10	4.80	4.34	118.88
Lakeevap Brantley, in.	3.58	4.31	4.69	9.81	10.23	12.97	13.01	10.09	8.79	7.01	3.70	3.34	91.54
Precip Brantley, in.	0.54	0.32	0.58	0.05	0.53	1.48	2.15	0.26	1.14	0.12	1.17	0.00	8.34
Netevap, inches	3.04	3.99	4.11	9.76	9.70	11.49	10.86	9.83	7.65	6.89	2.53	3.34	83.20
Evaploss Av, TAF	0.2	0.3	0.2	0.5	0.5	0.6	0.6	0.5	0.4	0.4	0.1	0.2	4.4
* Computed as WS elev by NM Report minus Gage datum at 3257.0 (USBR datum)													

Table 11. Change in Storage, Lake Avalon - 2001 - (B.4.g)

(Gage heights are end of month)

6/25/02

	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOT
	2000	2001												
WS NM Rept		75.70	76.00	72.80	73.00	73.10	73.00	73.10	73.10	73.40	73.10	72.40	73.60	
Gage EOM, ft*	18.00	18.70	19.00	15.80	16.00	16.10	16.00	16.10	16.10	16.40	16.10	15.40	16.60	
Storage, AF	2494	3027	3266	1026	1147	1209	1147	1209	1209	1397	1461	790	1525	
Change sto, TAF		0.5	0.2	-2.2	0.1	0.1	-0.1	0.1	0.0	0.2	0.1	-0.7	0.7	-1.0

* Computed as WS elev by NM Report minus Gage datum at 3257.0 (USBR datum)

Table 12. Data Required for River Master Manual Calculations, Water Year 2001

6/25/02	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
STREAMFLOW GAGING RECORDS, TAF													
Pecos R b Sumner Dam	0.1	0.4	3.3	6.1	46.6	6.5	30.6	6.0	6.8	5.8	0.7	2.1	114.9
Fort Sumner Main C	0.0	0.0	2.3	5.5	5.8	5.6	5.7	5.7	5.3	4.7	0.0	0.0	40.6
Pecos R nr Artesia	5.7	4.8	7.3	3.6	30.5	6.6	17.8	1.6	1.3	1.8	3.6	4.4	88.7
Rio Penasco at Dayton	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fourmile Draw nr Lakewood	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
South Seven Rivers nr Lkwd	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rocky Arroyo at Hwy Br nr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pecos R at Dam Site 3	1.5	1.6	3.3	13.5	14.5	16.5	12.4	8.5	7.2	6.4	6.6	4.0	96.0
Pecos bel Avalon Dam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	2.8	9.6
Carlsbad Main Canal	0.0	0.0	3.2	11.8	12.1	14.7	11.4	7.1	5.9	5.3	0.0	0.0	71.4
Dark Canyon at Carlsbad	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pecos below Dark Canyon	1.7	2.4	1.4	0.8	0.4	0.4	0.3	0.2	0.2	0.6	6.3	3.1	17.8
Pecos R at Red Bluff	4.9	4.7	4.5	3.3	2.1	2.0	1.9	1.9	2.0	2.2	8.4	5.7	43.7
Delaware R nr Red Bluff	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.3
GAGE HEIGHTS													
Avalon gage ht, end mo	75.70	76.00	72.80	73.00	73.10	73.00	73.10	73.10	73.40	73.10	72.40	73.60	
Avalon gage ht, avg	75.44	75.91	73.30	73.06	73.09	72.91	73.16	73.19	73.20	73.44	73.50	72.10	
Alamogordo ga ht, end mo	57.13	58.69	59.61	58.52	43.44	40.04	42.24	39.92	35.16	31.99	41.98	44.92	
Alamogordo gage ht, avg	56.05	57.90	59.51	59.08	54.96	41.88	42.14	41.46	36.95	32.99	37.84	43.37	
Lake S Rosa ga ht, end mo	5.51	7.59	13.95	20.50	20.50	21.32	87.75	4.08	5.63	6.32	7.24	7.98	
Lake S Rosa ga ht, avg	4.87	6.58	10.76	17.31	20.65	21.08	2.40	96.37	4.96	6.98	5.98	7.61	
PRECIPITATION, INCHES													
Brantley Lake	0.54	0.32	0.58	0.05	0.53	1.48	2.15	0.26	1.14	0.12	1.17	0.00	8.34
Las Vegas FAA AP	0.77	0.85	1.23	0.21	0.89	2.08	1.38	2.02	0.44	0.32	1.40	0.11	11.70
Pecos National Monument	1.20	0.52	0.78	0.67	0.74	1.18	2.05	4.71	0.50	0.02	0.36	0.38	13.11
Santa Rosa	1.09	0.89	2.27	0.28	1.22	3.09	0.66	1.27	1.16	0.35	0.22	0.25	12.75
Lake Santa Rosa	1.57	1.03	1.71	0.25	1.29	2.00	0.57	2.60	1.59	0.39	1.60	0.20	14.80
Sumner Lake	0.73	0.65	1.27	0.03	0.65	0.97	0.61	0.99	0.77	0.34	1.08	0.08	8.17
PAN EVAPORATION, INCHES													
Lake Santa Rosa	3.72	4.98	7.12	9.12	8.93	12.58	12.38	9.39	7.96	6.49	4.13	3.76	90.56
Lake Sumner	1.86	3.71	4.04	12.49	11.21	14.30	15.10	11.83	10.25	7.00	2.44	3.03	97.26
Brantley Lake	4.65	5.60	6.09	12.74	13.28	16.85	16.90	13.11	11.42	9.10	4.80	4.34	118.88
OTHER REPORTS													
Base Acme-Art, TAF (USGS)	4.2	3.7	3.5	2.4	2.2	1.7	0.9	1.0	0.7	1.0	2.1	2.4	25.7
Pump depl Ac-Artesia, TAF	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.5
NM irrig inv, acres (3/9/2000)													11529
NM Transfer water use, TAF													0
NM salvaged water, TAF													0
Texas, water stored NM, TAF	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Texas, use Del water, TAF													

APPENDIX

RIVER MASTER'S RESPONSE TO STATES' OBJECTIONS

RESPONSE TO STATES' OBJECTIONS
Final Report, Accounting Year 2002

NEW MEXICO'S OBJECTIONS

1. *Table 12. Data Required for River Master's Manual Calculations, WY 2001:*

New Mexico reported errors in River Pumper data for April through November. The data for WY 2001 was not entered on Table 12. The objection is accepted and Table 12 has been revised.

2. *Table 11. Change in Storage, Lake Avalon – 2001 – (B.4.g):*

New Mexico reported errors in storage values for Lake Avalon for March through December. The objection is accepted and Table 11 has been revised. The total change in storage is shown as – 1.0 TAF.

3. *Table 9. Lake Avalon Leakage Lagged – 2001 – (B.4.c.1.g):*

New Mexico reported two errors on Table 12. The leakage value for December was in error and days shown for February should be 28 rather than 29. The objection is accepted. Table 9 was revised to show a lagged leakage of 17.4 cfs, rather than 17.1 cfs. The difference in 17.4 and 17.5 cfs, reported by New Mexico, appears to be in rounding off of numbers.

4. *Table 8. Carlsbad Main Canal Seepage Lagged – 2001 – (B.4.c.1.e):*

New Mexico noted that February should be shown with 28 days in Table 8. The objection is accepted, and the table has been revised.

5. *Table 7. Carlsbad Springs New Water – 2001 – (B.4.c):*

New Mexico reported that Table 7 should be revised to reflect changes in Table 9. The objection is accepted and Table 7 has been revised.

6. *Table 6. Depletions due to Santa Rosa Reservoir Operations – 2001 – (C.1.b):*

The River Master could not check New Mexico's first objection about gage height for November. The Preliminary Report's gage height figure of 5.98 feet was contained in New Mexico's letter to the River Master of March 15, 2002. The River Master could not find where New Mexico got its figure of 6.84 feet. Also, the calculation is the same with either value. New Mexico's second point is about a calculation of sum of contents using the resulting figures. These objections are rejected.

New Mexico reported an error in the interpolation for the July and November 1947 area calculation. The objection for July is accepted. The objection for November is rejected because it is based on the issue described in the previous paragraph.

Table 8 has been revised and now has the same value reported by New Mexico, 2.8 TAF adjustment.

7. *Table 3. Flood Inflow, Artesia to Carlsbad, WY 2001 (B.4):*

New Mexico's objections about Table 3 involve carry over of computations from Items 2 and 5 above. The objections are accepted, and Table 3 has been revised. The difference of 0.1 TAF between the River Master's and New Mexico's values is due to rounding.

8. *Table 2. Flood Inflow, Alamogordo to Artesia, WY 2001 (B.3):*

New Mexico's objection about Table 2 involves carry over of computations from Item 1 above. The objection is accepted, and Table 2 has been revised.

9. *Table 1. General Calculations of Annual Departures, TAF, WY 2001:*

As a result of New Mexico's objections, Table 1 has been revised to show a shortfall of 0.7 TAF, rather than a shortfall of 1.4 TAF.

TEXAS'S OBJECTIONS

Texas noted differences between the Preliminary Report and USGS data for reservoir content values of Sumner and Santa Rosa lakes. These differences do occur and are explained as follows. The River Master's Manual instructs the River Master to use the latest gage height, area, and content tables to compute reservoir surface areas and contents (see Table 6 of Preliminary Report). From the inception of accounting under the Amended Decree, the procedure has been to obtain average and end-of-month gage heights and to look up surface areas and contents. A few years ago, the procedure was instituted whereby New Mexico obtains the gage data and reports it (See New Mexico's letter to the River Master of March 15, 2002). This procedure saves time and

provides a common database for annual accounting. The River Master has observed that data computed this way differs from USGS content data, but does not know how USGS computes the content data. If the procedure is of concern to either state, it is suggested that the states agree on revised procedure.

FINAL CALCULATED DEPARTURE.

The Preliminary Report's Final Calculated Departure was – 1.4 TAF. After considering the states' objections, the Final Determination is – 0.7 TAF.

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No. 105, Original

Supreme Court, U.S.
FILED
JAN 22 2004
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In The Supreme Court of the United States

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

and

UNITED STATES OF AMERICA,

Defendant-Intervenor.

On Exceptions To The Fourth Report Of The Special Master

KANSAS' EXCEPTIONS AND BRIEF

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EXCEPTIONS TO THE FOURTH REPORT OF THE SPECIAL MASTER

The State of Kansas excepts to the recommendations of the Special Master that the Court:

1. Not appoint a river master to administer the decree in this case (Recommendation 12);

2. Calculate prejudgment interest as set forth in the Special Master's Order dated December 2, 2002 (Recommendation 1);

3. Approve Colorado's proposal to measure its Arkansas River Compact compliance over a ten-year period (Recommendation 11);

4. Rely on the local Colorado water court to quantify Colorado's credits under the Compact (Recommendation 9); and

5. Find that Colorado complied with the Compact during the period 1997-1999 (Recommendation 4).

The State of Kansas further excepts to:

6. The failure of the Special Master to make recommendations on all issues pending before him.

Respectfully submitted,

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BRIEF IN SUPPORT OF KANSAS' EXCEPTIONS TO THE FOURTH REPORT OF THE SPECIAL MASTER

QUESTIONS PRESENTED

1. Should a river master be appointed to administer the decree in this case?

2. Should prejudgment interest be applied to damages found to be due in 1985, the year in which this case was filed?

3. Is Colorado's ten-year compliance period proposal consistent with the Arkansas River Compact?

4. Should the Supreme Court rely on Colorado to determine issues critical to the enforcement of Colorado's interstate compact obligations?

5. Did Colorado comply with the Compact during the period 1997-1999?

6. Should the Special Master be directed to make recommendations on all issues pending before him?

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I. STATEMENT

A. The Arkansas River Basin

The headwaters of the Arkansas River rise on the eastern slope of the Rocky Mountains at an altitude above 14,000 feet, not far from the towns of Leadville and Aspen, Colorado. Tributaries drain a basin of 25,400 square miles in Colorado that includes Pike's Peak and the City of Colorado Springs. The river flows south and east from its headwaters, through the Royal Gorge, leaving the mountains near Canon City, Colorado and flowing eastward through the towns of Pueblo, La Junta and Lamar, Colorado, and Garden City and Dodge City, Kansas. The Arkansas River then continues through the States of Kansas, Oklahoma and Arkansas, ultimately entering the Mississippi River southeast of Little Rock, Arkansas.

There are two major reservoirs, John Martin Reservoir and Pueblo Reservoir, that have been constructed on the mainstem of the Arkansas River in Colorado. They have a total storage capacity of over 1,000,000 acre-feet, with some 650,000 acre-feet of that available for irrigation and other beneficial uses. See 1 First Report 44-45; Jt. Exh. 129, at 46; Jt. Exh. 18, ARCA Annual Report 7 (1985). Twenty-three canal systems divert from the mainstem in Colorado between Pueblo and the Kansas stateline, providing water to approximately 300,000 acres of irrigated land in Colorado. A number of private reservoirs store water offstream in Colorado. Six canal systems in Kansas divert water from the Arkansas River for the irrigation of approximately 44,000 acres in Kansas. App. to Third Report 86, col. b. There is only one reservoir in Kansas above Dodge City, an offstream reservoir, with a total storage capacity of some 3,600 acre-feet. See *Kansas*

v. Colorado, 514 U.S. 673, 675-677 (1995); 3 First Report 438 (1994).

More than a thousand large irrigation wells were drilled along the Arkansas River in Colorado after the adoption of the Arkansas River Compact. 1 Third Report 103. Groundwater pumping in Colorado increased from 15,000 acre-feet per year prior to the Compact, *Kansas v. Colorado,* 514 U.S., at 689-691, to a high of about 287,000 acre-feet per year after the adoption of the Compact. Joint Exh. 175, *cited in* Second Report 11 (1997).

B. The Arkansas River Compact

Kansas and Colorado signed the Arkansas River Compact in 1948. App. 1, at 1. In 1949, the Kansas and Colorado legislatures approved, and Congress ratified, the Arkansas River Compact. 63 Stat. 145. The Compact is found in Appendix 1 to this Brief. The adoption of the Compact followed two original jurisdiction cases in this Court, *Kansas v. Colorado,* 185 U.S. 125 (1902), 206 U.S. 46 (1907), and *Colorado v. Kansas,* 320 U.S. 383 (1943), and the recommendation of the Court that the States seek to resolve their differences by negotiation pursuant to the Compact Clause of the Constitution. 320 U.S., at 392; U.S. CONST., art. I, § 10, cl. 3.

The Compact consists of nine articles. Its primary purposes, as stated in Article I, are to "[s]ettle existing disputes and remove causes of future controversy between the States of Colorado and Kansas, and between citizens of one and citizens of the other State, concerning waters of the Arkansas River" and to "[e]quitably divide and apportion" the waters of the Arkansas River and the benefits of John Martin Reservoir. App. 1, at 2.

Article II of the Compact provides that the Compact is based on three grounds, including the opinion of this Court in *Colorado v. Kansas*, 320 U.S. 383 (1943). *Id.*, at 2-3.

Article IV-D of the Compact provides:

> "This Compact is not intended to impede or prevent future beneficial development of the Arkansas River by Federal or State agencies, by private enterprise, or by combinations thereof, which may involve construction of dams, reservoir, and other works for the purposes of water utilization and control, as well as the improved or prolonged functioning of existing works: Provided, that the waters of the Arkansas River . . . *shall not be materially depleted in usable quantity or availability for use* to the water users in Colorado and Kansas under this Compact by such future development or construction." *Id.*, at 5-6 (emphasis added).

Article V of the Compact provides the "basis of apportionment of the waters of the Arkansas River." Articles V-A through V-D apply to the operation of John Martin Reservoir. Article V-E specifies, among other things that "[t]here shall be no allowance or accumulation of credits or debits for or against either State." *Id.*, at 8.

Article VI addresses the relationship between the Compact and the administration of water within the respective States. Article VI-A(2) states:

> "Except as otherwise provided, nothing in this Compact shall be construed as supplanting the administration by Colorado of the rights of appropriators of waters of the Arkansas River in said State as decreed to said appropriators by the courts of Colorado, nor as interfering with the

distribution among said appropriators by Colorado, nor as curtailing the diversion and use for irrigation and other beneficial purposes in Colorado of the waters of the Arkansas River." *Id.*, at 10.

Article VIII establishes and defines the powers of the Arkansas River Compact Administration (ARCA). Each State is equally represented on ARCA. There is a nonvoting federal chairman. Article VIII-D provides that "[e]ach State shall have but one vote in the Administration and every decision, authorization or other action shall require unanimous vote." *Id.*, at 12.

C. Proceedings Leading to the Special Master's Fourth Report

The State of Kansas commenced this proceeding in 1985, alleging violations of Article IV-D of the Compact. Trial commenced in 1990. The Special Master filed his First Report in July 1994. 513 U.S. 803 (1994). Both States filed exceptions to the First Report. The Court overruled all exceptions, held that Colorado had violated the Compact as a result of increased postcompact groundwater pumping in Colorado, and remanded the case to the Special Master. *Kansas v. Colorado*, 514 U.S. 673 (1995).

On remand, the Special Master held additional trial proceeding and received further briefs. He determined depletions in violation of the Compact for the years 1950-1994 to be 420,070 acre-feet. See Second Report 112. He filed his Second Report with the Court in September 1997. 522 U.S. 803 (1997). Colorado filed two exceptions to the Second Report, but the Court simply remanded the case to the Special Master for further proceedings. 522 U.S. 1073

(1998). Thereafter, the Special Master held trial on Colorado's violations for the two-year period 1995-1996 and on the remedy for Colorado's violations of the Compact from 1950 through 1994. The Special Master determined that violations had occurred in 1995 and 1996 in an aggregate amount of 7,935 acre-feet. App. to Third Report 64. The States later stipulated to the amount of money damages associated with the two years 1995 and 1996. See App. to Fourth Report 18.

The Special Master submitted his Third Report to the Court in August 2000. 531 U.S. 921 (2000). The Third Report was primarily devoted to recommendations on the remedy for past violations of the Compact by Colorado. Kansas filed one exception to the Third Report. Colorado filed four exceptions. After briefing and argument, the Court issued its Opinion on June 11, 2001. *Kansas v. Colorado*, 533 U.S. 1 (2001). In its Opinion, the Court rejected Colorado's contention that the Eleventh Amendment precluded recovery by the State of Kansas based on losses sustained by individual water users in Kansas. *Id.*, at 7-9. The Court ruled that prejudgment interest was not barred by the unliquidated nature of the Kansas claim and that interest was not otherwise prohibited as a general principle. *Id.*, at 9-12. The Court rejected Colorado's challenge to the rates adopted by the Special Master for prejudgment interest. *Id.*, at 12-13. The Court, however, sustained a Colorado exception to the extent that it challenged the award of prejudgment interest for years prior to 1985. *Id.*, at 13-16. Finally, the Court rejected Colorado's exception to the Special Master's determination of the value of crop losses attributable to Compact violations. *Id.*, at 16-21.

On remand to the Special Master, and after a concerted effort to settle the litigation, the parties prepared for the final major trial phase in the case. The main issues considered at trial included (1) how to use the Hydrologic-Institutional Model (H-I Model) to test Colorado compliance with the Compact; (2) whether any of the improvements proposed by the States for the H-I Model were appropriate; (3) whether Colorado was in compliance with the Compact during the years 1997-1999; (4) whether Colorado's Use Rules are sufficient to achieve Compact compliance in the future; (5) what monitoring and verification standards must be observed with respect to the H-I Model input data and Colorado replacement actions; (6) what the standard should be for determining Colorado replacement credits; (7) whether Colorado should require totalizing flow meters to measure groundwater pumping; and (8) whether a river master should be appointed to administer the Court's decree in this case. Also during trial, based on briefs, the Special Master considered how the Court's ruling on prejudgment interest should be applied.

D. The Fourth Report

Trial took place between June 24, 2002 and January 17, 2003. Closing briefs were submitted in February and March 2003, and the Special Master provided a draft report to the parties in August 2003. The States submitted comments in September and October, 2003. The Special Master submitted his final report to the Court in November 2003. The Fourth Report was received and ordered filed on December 8, 2003. 72 U.S.L.W. 3391 (2003).

The Fourth Report contains the Special Master's consideration of 1997-1999 Compact compliance (Section III); measurement of Colorado's well pumping (Section IV);

Colorado's 1998 irrigated acreage study (Section V); crop consumptive use in the H-I Model (Section VI); Colorado's changes to the H-I Model (Section VII); contested dry-up credits (Section VIII); prospective Compact compliance modeling (Section IX); measuring Compact compliance (Section X); continuing jurisdiction and request for a river master (Section XI); and recommendations (Section XII). The Appendix to the Fourth Report is composed of 15 exhibits that include trial exhibits, the order of the Special Master on prejudgment interest, the stipulation of the States for damages for the 1995-1996 Compact violations, and other documents.

II. SUMMARY OF ARGUMENT

The central standard for Compact compliance that has been developed over the course of the litigation is the Hydrologic-Institutional Model. Annual updating of the H-I Model will be necessary in order to assess the effect of Colorado's postcompact pumping and to represent properly Colorado's annual changes in the sources and amounts of replacement water to offset depletions to usable flow. Inevitably, disagreements will arise. The resolution of such disagreements could be far more efficiently resolved by a river master appointed by the Court than by a series of original actions. As proposed by Kansas, the appointment of a river master would be entirely consistent with the precedents of the Court, particularly *Texas v. New Mexico*, No. 65, Original.

The Court has determined that prejudgment interest shall be applied to Kansas' damages for Colorado's violation of the Arkansas River Compact, but only from the year in which this litigation was initiated, 1985. When the Court made that determination, it did not specify

whether prejudgment interest should be applied to the amount of damages owing at the time of the filing, or whether it should apply only to damages accruing thereafter. The evident intent of the Court's ruling, however, was to protect the value of Kansas' claim during the pendency of the litigation. If prejudgment interest is not applied to the value of the Kansas claim owing in 1985, this purpose will not be accomplished.

The Special Master has recommended a ten-year compliance accounting period using the H-I Model for purposes of assessing Colorado's compliance with the Arkansas River Compact. If accepted, this recommendation would significantly reduce Kansas' rights under the Compact. After more than 15 years of work by the parties in the course of this litigation, the H-I Model has been accepted by the parties and the Special Master as the best tool to determine Compact compliance. See Fourth Report 109. It may be subject to some uncertainty, but how much uncertainty is unknown. There is no bias in the uncertainty of the H-I Model, and it constitutes the best method available to effectuate the agreement of the States in allocating the waters of the Arkansas River on an annual basis. In fact, the model has been applied annually throughout this litigation. Therefore, until a better method becomes available to effectuate the States' agreement, the H-I Model results should be used on an annual basis to determine the allocation between the States and to enforce the Court's interpretation of the Compact.

The Special Master's recommendation that the Court rely on Colorado to determine issues raised by this litigation is inconsistent with the Constitution and the decisions of this Court. See U.S. CONST., art. III, § 2; *West Virginia ex rel. Dyer v. Sims*, 341 U.S. 22 (1951). This Court

provides an impartial forum, in which the States are participants and may resolve their controversies. The disputes pending presently before this Court for resolution can be resolved by the Court with the assistance of the Special Master. Matters arising under the decree in this case can be resolved impartially by a river master appointed by the Court. Both present and future controversies between the States should be resolved by this Court, not by a Colorado state water court.

The Special Master's conclusion that Colorado had complied with the Compact during the years 1997-1999 was predicated on allowing accretions and depletions to be offset against each other over a period of three years. This is consistent with the Special Master's recommendation that a ten-year accounting period be adopted with respect to measuring Colorado's Compact compliance. For the same reasons that Colorado's ten-year accumulation of accretions and depletions is untenable, this three-year period is also untenable.

The Special Master has declined to rule on certain pending issues. He appears to have recommended that these issues be decided either by the Colorado water court or by this Court in the future. For reasons stated above, these issues, to the extent that they are susceptible of current determination, should be determined now. To the extent that they become issues in the future, in the course of the implementation of the Court's decree in this case, they should be assigned to a river master appointed by the Court.

III. ARGUMENT

A. A River Master Should Be Appointed to Enforce the Decree and to Avoid the Need for a Series of Original Actions.

1. Introduction

The H-I Model has become a necessary element of the enforcement of the Arkansas River Compact with regard to postcompact pumping in Colorado. The Court has held that such pumping caused violations of the Compact. The States have stipulated to the amount of violations in acre-feet for each year from 1950 through 1985. Second Report 11; Jt. Exh. 178. The Special Master has recommended, without exception from Colorado, that the Compact violations for the years 1986-1994 and 1995-1996 are 91,565 acre-feet and 7,935 acre-feet, respectively. Second Report 46; App. to Third Report 64; Jt. Exh. 183. All of these quantifications are based on the H-I Model. The Special Master has ruled that postcompact pumping is not a Compact violation per se and has refused to grant a motion for injunction filed by Kansas at an earlier stage of this litigation. App. to Second Report 12-25. Colorado has persisted in its efforts to utilize postcompact wells for agricultural purposes, and this has necessitated a quantification of the effects of such pumping on Colorado's Compact obligations. Therefore, use of the H-I Model will continue to be necessary for the foreseeable future.

Following the precedent of *Texas v. New Mexico*, 482 U.S. 124, 134 (1987), on the Pecos River, Kansas recommended that the Court appoint a river master to administer the decree in this case. In the Pecos River case, the Court appointed a river master, citing the "natural propensity of these two States to disagree if an allocation

formula leaves room to do so." The Court expressed concern that it would face a "series of original actions" absent some disinterested authority to make determinations binding on the parties. *Ibid.*

The Kansas proposal follows the example of the Pecos River Master in most respects. Thus, an Arkansas River Master would be appointed by the Court to administer the decree intended to assure future compliance. The River Master would have no authority to resolve Compact disputes between the States outside the scope of the decree. Rather, he or she would resolve disputes arising in the implementation of the decree. Application of the H-I Model, something that both States agree is necessary for the determination of Compact compliance, will be necessary on a yearly basis. The Special Master has proposed that the H-I Model be operated annually. Fourth Report 117. As a result, new hydrologic data will need to be collected and analyzed each year and prepared for input to the H-I Model. As the Fourth Report illustrates, the States continue to have "serious disagreements" about matters related to H-I Model updating "both as to data input and model coding." Fourth Report 121.

In conformance with the procedures adopted during the litigation, the States would be responsible for collecting the data, running the H-I Model and proposing any modifications to the H-I Model that one or both of the States considered appropriate or necessary. Matters on which the States could not agree would then be brought before the River Master for independent determination. Review would be possible by the Court under a clearly erroneous standard. The River Master's fees and expenses would be shared by the States. The Pecos River Master's fees are submitted quarterly and over the period since his

initial appointment have averaged approximately $12,000 per year. *Texas v. New Mexico*, 485 U.S. 388, 394 (1988).[1]

The Special Master declined to support the Kansas recommendation that a river master be appointed. See Fourth Report 125-136, 139. The factors considered by the Special Master in reaching this conclusion appear to have been whether the appointment of a river master would be to continue the litigation indefinitely; whether the function would be largely ministerial or would involve judgment; the similarities and dissimilarities between this case and the Pecos River litigation; whether it is practical for a river master to resolve disputes over the H-I Model; whether the Court precedents support the appointment of a river master; and the settlement of two interstate water disputes in the last several years. Fourth Report 125-135.

2. Appointment of a River Master is as Appropriate on the Arkansas as on the Pecos.

Kansas believes that a river master is necessary to bring this litigation to effective closure and to implement the decree of the Court in this case because the H-I Model, which is the standard for determining compliance under the Compact, requires annual updating and may need to be modified. The States will prepare annual updates based on the most recent data, new computer runs of the H-I

[1] The River Master's fees and expenses have ranged from a high of about $34,000 in 1992 to a low of about $5,000 in 2000. See *Texas v. New Mexico*, 504 U.S. 954 (1992); 506 U.S. 938 (1992); 506 U.S. 983 (1992); 507 U.S. 904 (1993); 530 U.S. 1212 (2000); 531 U.S. 921 (2000).

Model and analysis of the results of those runs. The States have often disagreed about the annual updating of the H-I Model. In the most recent update, initially intended for the two years 1997-1998, later extended to include 1999, the States disagreed on many issues. The States vigorously disputed, among other things, irrigated acreage (both total acreage and acreage in each canal area), supplemental acreage (acreage served by both surface and groundwater), dry-up credit inputs to the H-I Model, quantification of replacement credits outside the H-I Model, and calculation of potential evapotranspiration. Fourth Report 24-26.

A procedure is needed to resolve these ongoing disagreements over the implementation of the Special Master's recommended method for determining Compact compliance. The Colorado water courts do not have jurisdiction to enter judgments binding on the State of Kansas. See *Hinderlider v. La Plata River & Cherry Creek Ditch Co.*, 304 U.S. 92, 103 (1938). Nor, in this case, do the federal district courts, 28 U.S.C. § 1251(a); *Mississippi v. Louisiana*, 506 U.S. 73 (1992). This Court is the only court with the requisite jurisdiction. *Ibid.* Thus, a series of original actions to resolve these issues can be anticipated, placing an unnecessary burden on the Court and on the States unless a river master is appointed.

The most recent instance in which the Court has considered the appointment of a river master was the litigation between Texas and New Mexico over the interpretation and enforcement of the Pecos River Compact. *Texas v. New Mexico*, 482 U.S. 124, 134-135 (1987). In that case, the Court appointed a river master, saying, "[w]e are quite sure that our jurisdiction over original actions like this provides us with ample authority to appoint a master and to enforce our judgment." *Ibid.* Indeed, the Court

referred to the ongoing operation of the river master on the Pecos River in the recent oral argument on the Potomac River dispute. *Virginia v. Maryland*, No. 129 Orig., Oral Arg. Tr. 36 (Oct. 7, 2003) ("In fact, in the Texas against New Mexico case, . . . there's a river master on the Pecos River, operating under one of our decrees").

The Special Master acknowledged that there are "remarkable similarities" between the situation on the Pecos River and the present situation on the Arkansas River. Fourth Report 125. The Special Master pointed out that both cases involve interstate compacts; both Compacts establish commissions to administer them; commission action requires unanimous agreement; allocation of streamflows is made on the basis of precompact conditions without designating a specific quantity of water; and both cases have resulted in the Court finding compact violations of roughly similar magnitude (in the range of 10,000 acre-feet per year). See Fourth Report 125-126.

The Special Master pointed, however, to some differences that he saw between the Arkansas River and Pecos River situations.[2] He first pointed out that the Court had received a recommendation from the Special Master in the *Texas v. New Mexico* litigation that might lead to repayment in water, which would have been in addition to

[2] One important difference between the Pecos River and Arkansas River situations that was not mentioned by the Special Master relates to the existence of storage facilities in the downstream state. Kansas has essentially no downstream storage, whereas Texas has substantial storage at the stateline in the form of Red Bluff Reservoir. See *Texas v. New Mexico*, Special Master Report 18-19 (1979); 462 U.S. 554, 556 n.1 (1983).

determining ongoing compliance. *Id.*, at 126-127. He noted that, in the present case, past shortages are to be compensated by money damages, suggesting that such a difference supports not appointing a river master in this case. *Ibid.* Although the Special Master notes that the remedy for the past shortages on the Pecos River was later settled as a money judgment, *id.*, at 127 n.21, he does not point out that, even with the removal of any possibility that the River Master might be asked to make calculations with respect to repayment of past shortages in water by entry of a money judgment, the Court has maintained the appointment of the Pecos River Master to this day.[3] See, *e.g.*, *Texas v. New Mexico*, 502 U.S. 803 (1991) (awarding River Master fees and expenses and denying motion of New Mexico to review River Master's final annual report); 124 S.Ct. 460 (2003) (awarding River Master fees and expenses).

In *Texas v. New Mexico*, the Court, in its explanation of the reasons for appointing a river master, stated that the Special Master had recommended a river master "because applying the approved apportionment formula is not entirely mechanical and involves a degree of judgment." 482 U.S., at 134. In analyzing this issue, the Special Master in the present case relied on the 2002 Report of the Pecos River Master, which was before him as Colorado Exhibit 1407 and is included in the Appendix to

[3] On October 15, 1991, more than a year and a half after the entry of the stipulated money judgment, the Court confirmed and supplemented its order appointing the River Master by readopting the appointment order with an additional allowance for the cost of "competent legal advice deemed by him to be necessary to carry out his duties." *Texas v. New Mexico*, 502 U.S. 903 (1991).

the Fourth Report. App. to Fourth Report 87. The Special Master said, "It is not clear from this Report, however, how much judgment may be required in preparing the River Master's annual accounting, and indeed whether or not his duties are essentially ministerial as argued by Colorado." Fourth Report 127.

First, since Colorado Exhibit 1407 simply lists the results of the Pecos River Master's analysis, one would not expect the degree of judgment exercised to be apparent. Second, it appears that this Court's understanding in 1987 that the Pecos River Master's duties would include "a degree of judgment" was correct. This is shown by the Pecos River Master's Manual itself, which is attached to this brief as Appendix 2.[4] Inevitably, disagreements arise over the quality and analysis of data. See, *e.g.*, App. 3 hereto; App. to Fourth Report 102-105. In addition, the Pecos River Master's Manual directs the River Master to "select flood inflows by inspection of daily data" with respect to one of the tributaries of the Pecos River. App. 2, at 39. Thus, the River Master must rely on his own judgment to separate flood inflows from base flows. See App. 3, at 54 ("judgement normally will be required"), 56.

The River Master is also directed to adjust computed departures in the Compact compliance computations by

[4] The original Pecos River Master's Manual was introduced into evidence in this case as Kan. Exh. 1104. Kan. Exh. 1104 does not contain the Manual appendices, nor does it include changes in the Manual by the River Master since 1988. See, *e.g.*, Appendices 3 and 4 to this Brief. For ease of reference, Appendices 3, 4 and 5 to this Brief, all documents from the official records of the Court or the Court's Pecos River Master, are being forwarded to the Clerk of the Court and the parties together with a certificate of authenticity.

applying certain factors, including adjustments for salvage water in New Mexico and unappropriated flood waters. App. 2, at 23. The River Master is directed to "study" certain water salvage projects and "[d]etermine the amount of water salvaged." *Id.*, at 48. No criteria for determining the amount of water salvaged is provided. Further, "[t]he River Master shall determine and apportion any unappropriated flood waters using methodologies not inconsistent with applicable provisions of the Compact and this Manual." *Ibid.* Determining whether a methodology is not inconsistent with the Pecos River Compact and the Pecos River Master's Manual requires the exercise of considerable judgment in interpreting those documents.

The foregoing discussion demonstrates that the Pecos River Master is required to use a fair degree of judgment in quantifying tributary flood waters, salvaged water and unappropriated flood waters, all of which are components of the calculation of New Mexico's obligations to deliver water at the stateline.

As the Special Master acknowledges, the Pecos River Master even has the authority to modify the Pecos River Master's Manual itself, subject to review on clearly erroneous grounds by the Court. Fourth Report 129. The exercise of "a degree of judgment" by the Pecos River Master would clearly be required in such an instance.[5] The

[5] Special Master Charles J. Meyers in the Pecos case predicted the degree of judgment to be exercised by the Pecos River Master as follows: "The need for sound judgment will arise when one party seeks to modify the Manual without the concurrence of the other party. . . . For the most part, these proposed changes are likely to raise technical issues of hydrology or statistics, as to which the River Master will have expertise." App. 5, at 93-94.

Special Master states, however, that there is no evidence – contrary to assertions by Kansas – that the Pecos River Master has authority to "'change the quantitative standard for delivery of water at the stateline [which] is essentially the same function as performed by the H-I Model.'" *Id.*, at 129-130 (quoting Kan. Comments on Draft Fourth Report).

Section III-C of the Pecos River Amended Decree is entitled "Modification of Manual" and provides for modification upon agreement of the parties or by the River Master in response to a motion of one of the parties. 485 U.S. 388, 392 (1988). Final determinations of the River Master are subject to review by this Court, but "only on a showing that the final determination is clearly erroneous." *Id.*, at 393. And on page 1 of the Pecos River Master's Manual, Kan. Exh. 1104, an equation showing the index outflow is set out, with the statement, "This equation will be used to determine New Mexico's 1947 condition delivery obligation imposed by the Pecos River Compact." App. 2, at 22. This is "the approved apportionment formula," which "is not entirely mechanical and involves a degree of judgment." 482 U.S., at 134. Therefore, when the opening provisions of the Pecos River Master's Manual are compared to this Court's Amended Decree, it becomes clear that the Pecos River Master has the authority, on the motion of one or both of the States and subject to review, to modify the quantitative standard for delivery of water at the stateline on the Pecos River.

Further, there *is* evidence in this case that the quantitative standard for delivery of water at the stateline in the Pecos River Master's Manual "is the same function as performed by the H-I Model" in this case. We have already seen that the Pecos River Master's Manual

contains the quantitative standard for delivery of water at the stateline on the Pecos River. The H-I Model in this case is the quantitative standard for delivery of water at the stateline on the Arkansas River pursuant to the earlier rulings of the Special Master and this Court. See, *e.g.*, Fourth Report 121 ("Both states are bound, at least for now, to the use of the [H-I] Model to determine whether or not there are compact shortages at the Stateline"); *id.*, at 52 ("The H-I Model is designed, insofar as feasible, to replicate actual conditions and on that basis to calculate depletions of usable stateline flows").

The Special Master also asserts that there is no evidence that the Pecos River Master has ever changed the manual. *Id.*, at 130. Subsequent investigation of the records of the Supreme Court, in light of the Special Master's concern, shows that the Pecos River Master has changed the Pecos River Master's Manual. See Apps. 3 and 4 hereto. But knowing whether the Pecos River Master has ever exercised the most far-ranging "degree of judgment" authorized by the Amended Decree in *Texas v. New Mexico* is not necessary to a determination of whether the Pecos River Master has the authority to do so. He clearly has that authority.[6]

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[6] The Special Master, in the text of his discussion of the River Master issue, recommends that, in the future, original actions in this Court by either Kansas or Colorado to enforce the Compact not be accepted unless the dispute has first been taken to the Arkansas River Compact Administration. Fourth Report 136. A similar recommendation was made by the Special Master in *Oklahoma v. New Mexico*, No. 109, Orig., 501 U.S. 221 (1991). The Special Master in that case "recommended that the Court use this case to articulate various jurisdictional prerequisites and procedural guidelines for application in future

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3. Precedents Other Than the Pecos River Case Also Support Appointment of a River Master.

The Special Master points to the Delaware River litigation as the other example of the appointment of a river master. Fourth Report 130. *New Jersey v. New York*, 347 U.S. 995 (1954), to which the City and State of New York, the State of New Jersey, the Commonwealth of Pennsylvania and the State of Delaware were parties, resulted in the appointment by the Court of a river master, following an earlier denial without prejudice of a request for such an appointment. *New Jersey v. New York*, 283 U.S. 805 (1931). The appointment of the Delaware River Master by the Court has been complemented by the subsequent adoption of the Delaware River Basin Compact, 75 Stat. 688 (1961), and the Delaware River Master has continued to perform a vital function in the implementation of the Court's decree from 1954 to the present day.

The Special Master correctly questions a later assertion that the Delaware River Master performs "only ministerial acts." Fourth Report 130. The 1954 decree of the Court suggests that judgment is required in a number of the River Master's duties. For instance, the Delaware

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interstate compact litigation." *Id.*, at 228-229. The Court gave as an example the Special Master's recommendation that States certify that they had negotiated in good faith in an attempt to resolve the dispute without resort to the Court. *Id.*, at 229 n.3. The Court rejected the Special Master's recommendation, however, stating, "[W]e decline the Master's invitation to set forth prerequisites and guidelines, beyond those already in existence, for invoking this Court's original jurisdiction." *Id.*, at 241 n.11. Accordingly, Kansas objects to this recommendation by the Special Master in this case.

River Master is required to perform his duties with respect to certain reservoir releases "by appropriate observation and estimates." 347 U.S., at 1003.

Given the modeling and data analysis that will be necessary in the implementation of this Court's decree on the Arkansas River, it may be that more judgment is required on the Arkansas than on the Delaware, which, if true, is all the more reason to appoint a river master on the Arkansas and not leave implementation of the decree to a series of original actions.

The Special Master cites the case of *Wisconsin v. Illinois*, 281 U.S. 179 (1930), as a case "in which a request for a River Master or some type of continuing enforcement authority has been denied." Fourth Report 130. In that case, Justice Holmes, speaking for the Court, chose between two options suggested by the Special Master: (1) appointment of a commission to supervise the construction work ordered or (2) requirement of periodic filing with the Clerk of the Court of progress reports. The Court chose the second option, which arguably required more attention from the Court. Any of the parties were allowed to apply to the Court for action in response to the semiannual reports. *Wisconsin v. Illinois*, 281 U.S., at 201-202. Under these circumstances, it may be somewhat of an overstatement to describe the Court as having denied a request for a river master or some type of continuing enforcement authority. Indeed, in *Texas v. New Mexico*, 482 U.S. 124 (1987), the Court cited *Wisconsin* as an occasion in which the Court appointed an agent or functionary or employed a like solution to implement its decree. See *id.*, at 134.

The Special Master discusses the case of *Wyoming v. Colorado*, 298 U.S. 573 (1936), and states that the Court

"refused to appoint a water master to keep the records" of diversions. Fourth Report 131. There does not appear, however, to be any mention of a river master or like authority in the Court's discussion. See *Wyoming v. Colorado*, 298 U.S., at 585-586. Rather, the Court accepted Colorado's assurances of cooperation with Wyoming as the basis for denying a Wyoming request that the State of Wyoming be allowed to install its own measuring devices in Colorado. See *ibid.*

Thus, the only case cited by the Special Master in which a river master or some type of continuing enforcement authority has been denied is *Vermont v. New York*, 417 U.S. 270 (1974) (*per curiam*). That case involved a complaint by Vermont alleging water pollution, impedance of navigation and creation of a public nuisance by the State of New York in Lake Champlain and Ticonderoga Creek. The parties reached a settlement part way through trial before the Special Master. *Id.*, at 270-271. The Court considered and rejected the request of the parties that the Court appoint a "South Lake Master." There are decisive differences, however, between the *Vermont* case and this case. In this case, there is an interstate compact that the Court has interpreted so as to quantify the allocation of the waters of the Arkansas River between the States of Colorado and Kansas. In *Vermont* there was no compact. Nor was there was a quantitative determination of the respective rights of the States. The Court pointed out that "no findings of fact have been made; nor has any ruling been resolved concerning . . . equitable apportionment of the water involved." *Id.*, at 276. The Court further pointed out that "[t]he proposals submitted by the South Lake Master to this Court might be proposals having no relation to law." *Id.*, at 277.

There is no danger of such proposals being made by a river master appointed by the Court to administer the decree in this case. Here, the river master would not make proposals, but would make determinations in response to submittals by the two States, and he or she would be limited strictly to interpreting and implementing the decree entered by the Court. The considerations that caused the Court to deny a "South Lake Master" in *Vermont v. New York* therefore do not exist in this case.

The Special Master points to the recent settlement of two interstate water cases, one of which involved the States of Kansas and Colorado. Fourth Report 132-135, citing *Nebraska v. Wyoming*, No. 108, Orig., 534 U.S. 40 (2001); *Kansas v. Nebraska*, No. 126, Orig., 123 S.Ct. 1898 (2003). The settlement of some interstate issues, however, should not affect the relief approved in a contested case or lead the Court to suppose that issues that could not be settled in the Arkansas River Basin in the past can somehow be expected to be settled in the future. Indeed, the States have been demonstrably unable to resolve their major differences despite earnest efforts on both sides to do so. The most recent formal effort was in the fall of 2001. The States reported to the Special Master at the conclusion:

> "3. Unfortunately, despite the excellent services of the Mediators and the considerable efforts of the States, including extensive personal involvement of the Attorneys General themselves, it has not been possible to settle the remaining issues in the case at this time. The States, however, intend to continue to consider the possibility of settlement, especially upon completion of the final expert reports and related discovery." Joint Report of the States, App. to Fourth Report 23-24.

As the 2002-2003 trial segment shows, the parties were unable to settle the major issues dividing them.

Justice White, writing for a unanimous Court in *Oklahoma v. New Mexico*, 501 U.S. 221 (1991), rejected the Special Master's recommendation that an issue before the Court be referred to the Canadian River Compact Commission for "good-faith negotiations and possible resolution." *Id.*, at 228, 240-241.[7] Justice White wrote:

> "It is true that the Court has often expressed [a] preference that, where possible, States settle their controversies by mutual accommodation and agreement, but the Court does have a serious responsibility to adjudicate cases where there are actual, existing controversies between the States over the waters in interstate streams." *Id.*, at 241 (citations and internal quotation marks omitted).

Thus, while it is to be earnestly hoped that many controversies between Kansas and Colorado with respect to the implementation of the decree in this case will be settled by mutual accommodation and agreement, the Court has affirmed its responsibility to assure that it provides for the resolution of disputes that cannot be settled. The recent settlements, including No. 126, Original, are to be commended, but given the history of the two States on the Arkansas River, and the significant difference between the Compacts,[8] it cannot reasonably be presumed that

[7] Although there was a dissent with respect to other issues, the Court was unanimous on this point.

[8] For instance, under the Republican River Compact, an acre-foot allocation is made to the three States. Two of the States are both

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disputes will abruptly stop after more than a century of intermittent but continual disputes between the two States. See *Kansas v. Colorado*, 185 U.S. 125 (1902); *Colorado v. Kansas*, 320 U.S. 383 (1943).

4. Conclusion

A degree of judgment will be necessary in the implementation of the decree in this case. Therefore, the disputes that will inevitably arise between the States should be handled in the first instance by a river master appointed by the Court rather than by the Court directly. The Special Master is justly concerned that this litigation not continue indefinitely in its present form. Kansas' proposal will accomplish this goal by securing the entry of a specific decree and the handling of such disputes that do arise under the decree by a river master whose determinations would be reviewable by the Court, if necessary, under the clearly erroneous standard. In short, to the extent that there are disputes under the decree, it is far more efficient for the Court and the States if those disputes are handled by a river master rather than by the Court directly.

B. Prejudgment Interest Should Begin to Accrue in 1985 on the Damages Existing at That Time.

1. Introduction

The Court decided in its Opinion of June 11, 2001, that prejudgment interest should "begin to accrue" in

upstream and downstream States. Neither of these elements occurs in the Arkansas River Compact.

1985, the year in which Kansas filed its complaint in this action. *Kansas v. Colorado*, 533 U.S. 1, 15 (2001). The Court did not address, however, whether the interest should accrue on damages that Kansas had incurred as of that date, or whether it should accrue only on damages that Kansas would incur *after* that date. The Special Master has read the Court's Opinion in the latter sense. In an Order on December 2, 2002, the Special Master concluded:

> "I believe the Court intended to exempt all damages occurring before the suit was filed from any prejudgment interest (not including an adjustment for inflation.) Prejudgment interest should apply *only* to those damages occurring after filing suit, i.e., after 1985." App. to Fourth Report 14 (emphasis in original).

In his Fourth Report, the Special Master has recommended that interest be calculated in the manner specified in that Order. Fourth Report 137, ¶ 1. Believing that the Special Master has misconstrued the Court's Opinion in this regard, Kansas excepts to the Special Master's recommendation.

2. Procedural Background

The Court's Opinion of June 11, 2001, resolved several issues relating to the award of prejudgment interest. The unliquidated nature of Kansas' damages claim does not pose a categorical bar to such an award. 533 U.S., at 9-12. Interest should be awarded at the rates recommended by the Special Master in his Third Report. *Id.*, at 12-13. Finally, in regard to the accrual of interest on Kansas' damages, the Court ruled on three different positions:

(1) Kansas had argued that prejudgment interest should accrue from the time of its losses, beginning in 1950, in order to afford it full compensation. The Court rejected Kansas' argument, holding that "the equities in this case do not support an award of prejudgment interest from the date of the first violation of the Compact, but rather favor an award beginning on a later date." *Id.*, at 14.

(2) The Special Master had recommended in his Third Report that interest should accrue from 1969, when Colorado knew or should have known that it was violating the Compact. Third Report 103-107. He further recommended that Kansas' damages incurred in the years 1950-1968 should be adjusted for inflation "but should not bear compound interest reflecting the loss of use of those monies." *Id.*, at 107. The Court rejected the Special Master's recommendation on this point, ruling that interest should begin to accrue at a later date advocated by Colorado. 533 U.S., at 15-16 & n.5.

(3) Colorado had argued that interest should not begin to accrue until 1985, the date of the filing of Kansas' complaint. The Court agreed, sustaining Colorado's exception to the Third Report "insofar as it challenges the award of interest for the years prior to 1985." *Id.*, at 16. In so ruling, the Court did not state whether interest accruing after the filing of the complaint in 1985 should be computed on the damages then existing and unpaid, or whether it should be computed only on such damages as first arose after the filing of the complaint. See *id.*, at 15-16 & n.5.

After the Court issued its June 11, 2001 Opinion, a disagreement arose between the States regarding the correct interpretation of the Opinion. In particular, the

States differed over whether the Court intended that prejudgment interest should accrue on Kansas' damages owing as of its filing of suit in 1985, or only on such damages as it incurred *after* filing suit. The States submitted briefing on this issue, and the Special Master ruled on the matter on December 2, 2002. As stated above, the Special Master believed that the Court had intended to "exempt" all damages incurred before the filing of suit from any prejudgment interest, except for an inflation adjustment. He thus found that interest should accrue only on damages incurred after the filing of suit. App. to Fourth Report 14.

3. Prejudgment Interest Should Begin to Accrue in 1985 on Kansas' Damages Then Owing.

At issue is what the Court intended when it ruled that "after examining the equities for ourselves, . . . a majority of the Court has decided that [1985] is the more appropriate" date at which interest should begin to accrue. 533 U.S., at 15 & n.5. The Court clearly intended that interest should begin to accrue on Kansas' damages only from the year in which Kansas filed its complaint. What the Court did not address is whether it intended (1) that interest should accrue on the damages owing at that time, or (2) that interest should accrue only on damages later incurred. See *id.*, at 13-16.

Although the Court's Opinion itself does not directly answer the question, both law and logic point to a single reasonable interpretation. For well over a century, the Court has ruled consistently that prejudgment interest accrues on the damages then owing: "If a debt ought to be paid at a particular time, and is not, owing to the default of the debtor, the creditor is entitled to interest from that

time by way of compensation for the delay in payment." *Young v. Godbe*, 82 U.S. (15 Wall.) 562, 565 (1873). In *Funkhouser v. J.B. Preston Co.*, 290 U.S. 163 (1933), the Court observed that "the injured party has suffered a loss which may be regarded as not fully compensated *if he is confined to the amount found to be recoverable as of the time of breach* and nothing is added for the delay in obtaining the award of damages." *Id.*, at 168 (emphasis added). Adjustment for inflation aside, the Special Master's recommended resolution would confine Kansas to the amount found to be recoverable as of the time of breach for all damages incurred in the years 1950-1984. Nothing would be added for the delay from 1985 to the date of judgment in obtaining those damages. See *ibid.*

Colorado signed the Arkansas River Compact in 1948. App. 1, at 1. The Court's decisions make clear that by that time there was nothing controversial about the proposition that prejudgment interest should be applied to the damages owed as of the date that interest begins to accrue. See 533 U.S., at 10-12 & n.4, 14 (finding that when Colorado signed the Compact it "was on notice that it might be subject to prejudgment interest if such interest was necessary to fashion an equitable remedy"). Today, of course, that proposition remains uncontroversial. See *Milwaukee v. Cement Div., National Gypsum Co.*, 515 U.S. 189, 196 (1995) (noting that prejudgment interest serves to compensate "'for the loss of use of money due as damages from the time the claim accrues until judgment is entered'") (quoting *West Virginia v. United States*, 479 U.S. 305, 310-311, n.2 (1987)).

The Court did not suggest that any portion of Kansas' damages should be exempt from interest once it begins to accrue. Rather, it ruled that "the equities in this case do

not support an award of prejudgment interest from the date of the first violation of the Compact, but rather favor an award *beginning on a later date*." 533 U.S., at 14 (emphasis added). The Court determined that "considerations of fairness," rather than a "rigid theory of compensation for money withheld," were appropriate in arriving at such an award. *Id.*, at 13-15. It cited with approval the specific considerations identified by the Special Master in support of its conclusion that interest should not begin to accrue until 1985.

But these same considerations of fairness support a determination that interest *should* begin to accrue in 1985 on the damages that Colorado then owed to Kansas. Thus, the Court agreed with the Special Master that interest should not accrue in the early years from 1950 forward, when "no one had any thought that the pact was being violated." 533 U.S., at 14. In contrast, by the time Kansas filed suit in 1985, no one could claim ignorance. In fact, the Special Master found that Colorado knew or should have known some 17 years earlier, by 1968, that it was violating the Compact. Third Report 103. The Court did not disturb that factual finding although it determined that interest should not begin to accrue at the earlier date. See 533 U.S., at 15, n.5.

Similarly, the Court agreed with the Special Master that there was a "long interval that passed between the original injuries and these proceedings." *Id.*, at 14. In contrast, there was no interval at all between 1985 and these proceedings, and this is true precisely by reason of the Court's determination that interest should not begin to accrue until the commencement of these proceedings. The Court found that before 1985, "it was uniquely in Kansas' power to begin the process by which [its] damages would

be quantified." *Id.*, at 16. Since 1985, by contrast, it has been uniquely in Colorado's power to protect against the running of interest, whether by tendering a sum of damages to Kansas or by placing the sum in an interest-bearing trust fund. See *In re Oil Spill by the Amoco Cadiz*, 954 F.2d 1279, 1331-1332 (7th Cir. 1992) (*per curiam*). The limitation of interest to the period since 1985 has removed any concern about Colorado being caught unawares by a dramatic compounding of interest.

Colorado has argued that the Court intended to adopt the Special Master's view that damages incurred before Kansas' filing of suit should bear no prejudgment interest, except for an inflation adjustment. Thus Colorado has noted that the Court overruled Kansas' exception to the recommendation in the Third Report that interest should be awarded only from 1969 to the date of judgment. Colorado's Brief in Support of Its Motion to Determine the Amount of Damages and Prejudgment Interest for the 1950-94 Period at 10 (Oct. 11, 2002). It has also noted that, in connection with the briefing of their exceptions to the Third Report, the States estimated that Kansas' damages with prejudgment interest approximated $38 million when calculated as the Special Master had directed. Brief in Support of Kansas' Exception to the Third Report of the Special Master at 9 (Nov. 24, 2000); Brief in Support of Colorado's Exceptions to the Third Report of the Special Master at 6 (Nov. 24, 2000).

Colorado fails, however, to take account of the basis for the Court's decision that interest should be awarded beginning in 1985. In Colorado's view, the Court merely "changed the date" at which interest on Kansas' damages begins to accrue from 1969 to 1985, as if a mere clerical error were at issue. Colorado's Brief in Support of Its

Motion to Determine the Amount of Damages and Prejudgment Interest for the 1950-94 Period at 10 (Oct. 11, 2002). The change of date, however, reflects a fundamental shift as between the rationale on which the Special Master relied and that on which the Court settled in determining that interest should begin to accrue in 1985. The clear basis for the Court's ruling is that Colorado indisputably was on notice of Kansas' claims once it was served with Kansas' complaint. At that point it could not be argued that Colorado's ignorance should relieve it of the obligation to pay interest on Kansas' damages, particularly those that had already been incurred.

Colorado has also suggested that the Court's Opinion reflects an intent to limit Kansas to an interest award of a specific amount. Colorado places particular emphasis on the Court's statement that the Special Master acted properly "*in only awarding as much prejudgment interest as was required by a balancing of the equities.*" Colorado's Reply to Kansas' Brief on Unresolved Damages Issues for the Period 1950-94 at 2-3 (Oct. 31, 2002) (Colorado's emphasis). It protests that Kansas' interpretation of the Court's Opinion, if sustained, would "somewhat astonishingly" result in a larger award of interest than if the Court had simply overruled all exceptions to the Special Master's Third Report. Colorado's Brief in Support of Its Motion to Determine the Amount of Damages and Prejudgment Interest for the 1950-94 Period at 6 (Oct. 11, 2002).

The Special Master apparently was persuaded by Colorado's argument. In his view, "the plain direction" of the Court's Opinion "was to limit the application of prejudgment interest," whereas Kansas' position would "move the award in the opposite direction." App. to Fourth Report 14-15. Thus, from the Court's statement that

interest should be denied for the period between 1968 and 1985, the Special Master inferred an intent "to exempt all damages occurring before the suit was filed from any prejudgment interest." *Ibid.*

It is certainly true that the Court intended to limit Kansas' recovery of prejudgment interest, and it did so by deferring the date of accrual of interest from 1950 to 1985. But Kansas does not perceive in that limitation an intent to fix the interest award at a specific dollar amount. The Court unquestionably intended that neutral principles should determine the resulting interest award, not that a fixed result should determine the operation of those principles. The neutral principles at work in this case support the award of interest accruing as of the time that Colorado was confronted with this lawsuit. Indeed, with the filing of suit, Colorado was much more clearly on notice of Kansas' claim for past violations of the Compact than of any potential violations that might occur thereafter.

Because Kansas is limited to recovery of interest accruing after its filing of suit in 1985, it will not be compensated for the 35 years of investment income that it could have produced over the years 1950-1984. For the same reason, Colorado and its citizens will retain all investment income produced over those years at Kansas' expense. See Third Report 101 ("[W]e should not be oblivious to Colorado's use of the water over this long period of years"). The Court has not suggested, however, that Kansas should further be denied the income that it could have earned *after* 1985 but for Colorado's withholding of money due as damages. It is inconsistent with the Court's ruling to deny Kansas compensation for its ongoing loss of investment income in the years from 1985 through the entry of judgment. Although Colorado will

keep the investment income that it realized through 1985 at Kansas' expense, the evident purpose of the Court's ruling is to restore to Kansas the income foregone thereafter.

The Court's ruling that Kansas is entitled to recover the damages incurred in the years 1950-1984 is in effect a determination that Kansas was entitled to recover those damages at the time it filed suit in 1985. See *Texas v. New Mexico*, 482 U.S. 124, 129 (1987) ("There is often a retroactive impact when courts resolve contract disputes about the scope of a promisor's undertaking; parties must perform today or pay damages for what a court decides they promised to do yesterday and did not"). Were it possible to avoid litigation delay, a judgment could have been entered for Kansas in 1985 for the damages incurred as of that time, adjusted for inflation only. In that case, Kansas would have been protected in either of two ways against lost use of the damages: If Colorado had promptly paid the judgment, Kansas could have invested the money itself. If Colorado had delayed payment, Kansas would have been entitled to postjudgment interest until the judgment was paid. *Id.*, at 132, n.8.

It was not possible, of course, to avoid litigation delay "[d]espite the diligence of the parties and the Special Master." *Kansas v. Colorado*, 533 U.S., at 16. But the effect of that delay "is neutral between the parties." *In re Milwaukee Cheese Wis., Inc.*, 112 F.3d 845, 849 (7th Cir. 1997). "Unfortunate though it is that this case has lasted as long as [it has] . . . , an award of prejudgment interest still restores the parties to the positions they would have occupied had this case concluded in the 1980s rather than the [2000s]." *Ibid.*

4. Conclusion

The Court has ruled that interest should begin to accrue in 1985. That ruling does not address whether the interest should accrue on the damages then owing or only on damages later incurred. The evident intent of the Court's ruling, however, is to protect Kansas from the loss of use of money due as damages during the pendency of the litigation. That intent can be effectuated only if interest is awarded on the damages owing as of 1985, when this litigation began.

C. Colorado's Ten-Year Compliance Period Proposal is Inconsistent With the Compact.

1. Introduction

The H-I Model has been developed over the last 18 years in the course of this litigation for the purpose of quantifying Colorado's Compact obligation. In the course of its development, the H-I Model has been subjected to intense scrutiny and has been successively improved, with the last improvements recommended as part of the Special Master's Fourth Report. See Fourth Report 53-79 (approval of the Penman-Monteith Method for calculating crop consumptive use). Few models have been subject to the scrutiny to which the H-I Model has been subjected. Its results benefit from the fact that they are the difference between two runs of the model, one under current conditions and one without postcompact pumping. When the two runs are subtracted, any errors that occur in both runs cancel out and enhance the accuracy of the results as compared to the accuracy of the individual runs. See 2 First Report 250-251. As the Special Master acknowledges, both States relied upon experts who were "extremely well

regarded" and among the "best . . . in the country." Fourth Report 110. And the experts were using computer modeling and methods of analysis that were largely unknown at the time of the negotiation of the Compact in the late 1940s. Nevertheless, the Special Master, at the urging of Colorado, has determined that the H-I Model is not sufficiently accurate to allow enforcement of short-term Compact obligations over periods of a year or less. See *id.*, at 115. In contrast, Colorado regulates well pumping on a monthly basis for the protection of its own water users. *Id.*, at 10.

The parties agree that the H-I Model should be used to determine Colorado's compliance with the Arkansas River Compact. They differ, however, with regard to the period over which compliance should be measured. Kansas believes that the accounting period should be one year, beginning at the start of the irrigation season and running until just before the next irrigation season. Fourth Report 108-109. Colorado, on the other hand, believes that the accounting period should be ten years. *Id.*, at 116-118.

Kansas believes that the Compact contemplates an accounting period no longer than one year, as argued below. The Special Master, however, finds that "the H-I model is not sufficiently accurate on a short-term basis to be used to determine compact compliance on a monthly or annual basis." *Id.*, at 115. The Special Master therefore disagrees with Kansas' contention that Colorado's ten-year proposal is contrary to the Compact, saying, "The proposal

is simply the most accurate way of determining the actual Kansas entitlement under the Compact."[9] *Id.*, at 120.

This Court has stated firmly that no court may order relief inconsistent with the express terms of an interstate water compact. *Texas v. New Mexico*, 462 U.S. 554, 564 (1983) ("[U]nless the Compact to which congress has consented is somehow unconstitutional, no court may order relief inconsistent with its express terms"). Nor will this Court order relief inconsistent with its interpretation of an interstate allocation by Congress or by compact. See *Arizona v. California*, 373 U.S. 546, 565-567 (1963); *New Jersey v. New York*, 523 U.S. 767, 810-812 (1998). Yet that is precisely what the Special Master has recommended in adopting Colorado's proposal for a ten-year accounting period.

2. A Compliance Period of One Year or Less is a Critical Element of Kansas' Compact Rights.

The Special Master recognized the critical nature of the Arkansas River Compact requirement of timely compliance when he stated in his First Report to the Court:

> "Kansas properly seeks protection against an averaging process that would allow depletions to be offset by later accretions that might not be usable because of amount or timing, or might simply come too late to compensate for earlier injury." 2 First Report 262.

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[9] The Special Master indicated that additional evidence may be necessary. Fourth Report 120.

The Special Master also pointed out that when the States of Kansas and Colorado were before the Court in 1943, the Court emphasized the variable nature of the water supply:

> "'*The critical matter is the amount of divertible flow at times when water is most needed for irrigation. Calculations of average annual flow, which include flood flows, are, therefore, not helpful in ascertaining the dependable supply of water usable for irrigation.*'" *Colorado v. Kansas*, 320 U.S. 383, 396-397 (1943), *quoted in* 2 First Report 291-292 (1994) (emphasis in the Special Master's Report).

The Court's concern that water be available for use when it is needed became a guiding principle of the Compact negotiators, as shown by Article II of the Compact:

> "The provisions of this Compact are based on . . . (2) the opinion of the United States Supreme Court entered December 6, 1943, in the case of *Colorado v. Kansas* (320 U.S. 383) concerning the relative rights of the respective States in and to the use of waters of the Arkansas River. . . . " App. 1, at 2.

The critical nature of timely compliance was also recognized in the proviso of Article IV-D:

> "Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity *or availability for use* to the water users in Colorado and Kansas under this Compact by such future development or construction." *Id.*, at 5-6 (emphasis added).

Article IV-D thus emphasizes that water cannot be depleted when it is needed and paid back at some other time.

Article V is the primary apportionment paragraph of the Compact. Article V begins "Colorado and Kansas hereby agree upon the following basis of apportionment of the waters of the Arkansas River." *Id.*, at 6. Article V-E(5) provides, "There shall be no allowance or accumulation of credits or debits for or against either State." *Id.*, at 8. This provision of the Compact emphasizes the high priority placed on timeliness of delivery by the Compact as a general principle. The record of the Arkansas River Compact Commission negotiations make this principle even clearer. During the 14th meeting of the Commission, Colorado Commissioners Mendenhall and Ireland commented on this provision:

> "Commissioner Mendenhall suggested that Colorado would not have to wait until the end of the season to complain; that if they did not make delivery, if they violated the compact, there would be complaint the next day. Commissioner Ireland stated that he appreciated that point but that this paragraph was inserted purposely to establish that there would be no carry-over from year to year." Jt. Exh. 3, at 14-84.

While this principle finds expression in the Compact in the major apportionment provision relating to operation of John Martin Reservoir, it evinces the concern that the Compact negotiators recognized with regard to the need for short-term compliance with Compact delivery obligations.

In light of the foregoing, depleting usable flows in one year and overdelivering in the next year would not satisfy Article IV-D or the concerns that the Compact was intended to address. In the worst case, Colorado might otherwise be permitted to deplete in dry years and overdeliver in wet years as it claims to have done in the "exceptionally wet" years of 1997-1999. See Fourth Report 107.

Also, if an underdelivery occurs in the first year of a ten-year compliance period, there will be no requirement that that underdelivery be recognized and remedied in that year or the next. Rather, under Colorado's scheme, it may go unremedied for as long as ten years. And, to the extent it is recognized at all, the underdelivery is only recognized in conjunction with nine other years of results.

3. As in the Pecos River Case, Concerns Regarding the Accuracy of the Best Method to Assess Compact Compliance Should Not Dissuade the Court From Enforcing the Compact Allocation Agreed to by the States.

The Court recognized the existence of uncertainty with regard to the inflow-outflow methodology that it was adopting for allocating the flows of the Pecos River between Texas and New Mexico. The Court stated:

> "[I]t may be that because of the unpredictability and peculiarities of the Pecos, the inflow-outflow methodology we have ordered implemented will not reflect the realities of the river. In that event, it would be appropriate to seek another amendment of the decree, as has been done in other original actions." *Texas v. New Mexico*, 482 U.S. 124, 133 (1987).

In other words, the Court found it appropriate to order a very specific standard to determine compact compliance on the Pecos River, with the proviso that if, because of the unpredictability and peculiarities of the Pecos, the methodology adopted was not fully satisfactory in the future, it would provide a means to make appropriate adjustments. Thus, the Court adopted a specific standard, the best that the Court could determine at the time, reserving the

possibility that it would be necessary to change the methodology in the future.

Following the Court's 1987 Opinion in *Texas v. New Mexico*, the case was remanded to the Special Master for, among other things, specifying the "duties of the river master and the consequences of his determinations." 482 U.S., at 135. On remand the Special Master prepared a proposed amended decree and filed a report. See App. 5 hereto. New Mexico, the upstream State, argued that the Pecos River was "highly variable" and that New Mexico's delivery obligation should be "smoothed out over a longer period than the yearly delivery requirement contemplated in the proposed Amended Decree."[10] App. 5, at 90. New Mexico also asked that her delivery obligations should be measured over a five-year period and that she not be deemed in default until her shortfalls exceeded 30% of the five-year delivery obligation. *Ibid.* The Special Master rejected the New Mexico request, stating, "so long as the principle survives that New Mexico owes water to Texas under the Compact, the only sure, or even probable, way of honoring that principle is to make the delivery obligation an annual one."[11] *Id.*, at 90-91.

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[10] Similarly, in the present case, the Special Master asserts "the need to smooth out the model results." Fourth Report 112.

[11] The urgency of annual Compact compliance is considerably greater on the Arkansas River than on the Pecos River, since there is no significant storage in the downstream State on the Arkansas, whereas there is such storage on the Pecos River. See note 2, *supra*. This difference is reflected in the compacts themselves. The Arkansas River Compact manifests the need for speedy compliance to a much greater degree than the Pecos River Compact. If annual compliance is necessary on the Pecos River, it is all the more necessary on the Arkansas River.

The Special Master in *Texas v. New Mexico* also addressed New Mexico's concerns about the accuracy of the curve that defines New Mexico's stateline delivery obligation:

> "The 1947 condition, as defined in these proceedings, has to be translated into a water quantity to provide a numerical standard for measurement of compliance, and *this necessarily involves a margin of error*. I might add that the margin of error here is not one sided: Texas suffers equally when the curve errs on the side of understating the Article III(a) obligation." App. 5, at 92 (emphasis added).

New Mexico also argued that "the 1947 condition curve is not completely accurate in representing the 1947 condition." *Id.*, at 97. The Special Master responded that, "the inflow-outflow equation is not a formulation by an Einstein of an immutable law of physics." *Id.*, at 98. Thus, the Court and the Special Master in *Texas v. New Mexico* were fully aware of the uncertainties of the quantification that they were adopting to define New Mexico's obligation. Nevertheless, in spite of known uncertainty, the Court, on the recommendation of the Special Master, adopted the best method available to quantify New Mexico's obligation. It noted that the uncertainty was unbiased, just as it is in this case. Consequently, the remedy provided in the Pecos River litigation is fully consistent with the remedy requested by Kansas here. That is, despite the existence of some uncertainty, the Court is fully justified in using the best method available, which minimizes the uncertainty to

the greatest extent possible[12] and insures that the uncertainty that does exist is neutral and unbiased. Abrogation of a State's rights under a compact, because the method of quantification is less than perfect, should be resisted in this case just as it was in *Texas v. New Mexico*.

4. Depletions and Damages Have Been Determined on an Annual Basis Throughout This Litigation.

During the course of this litigation, the annual violations by Colorado for each year beginning in 1950 have been determined and have been used as the basis for the States' recommendations to the Special Master and for the Special Master's determinations. The initial grouping of years was 1950-1985, 36 years. Then a group of nine years was analyzed with the H-I Model, namely, 1986-1994. Next, 1995 and 1996 were assessed using the H-I Model. In the present trial segment, two years, 1997-1998, were analyzed initially, and then a third year, 1999, was added because enough time had passed to allow the 1999 data to become available.

Moreover, throughout the course of this case, the H-I Model has been utilized to develop annual figures of depletions and accretions to usable stateline flows. Thus, in Jt. Exh. 183 the States agreed to an annual listing

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[12] Substantial efforts have been made to calibrate the model and minimize the associated uncertainty. One advantage that the H-I Model has over the curve that was adopted by the Court in the Pecos River litigation is that the results of the H-I Model are the result of taking the difference between two runs of the model. The process of taking the difference of two runs tends to cancel out errors that occur in both runs, improving the certainty of the results. See 2 First Report 250-251.

showing depletions and accretions to usable flows for each year from 1950 through 1996. Further, the individual yearly results have been utilized in the determination of money damages. Many factors that determine money damages vary on a yearly basis, and different yearly values were used between 1950 and 1994 for critical economic factors such as crop prices, labor prices, energy prices and the like. See generally 1 Third Report (2000). Thus, it was critical to that analysis whether depletions of usable flow and violation of the Compact as determined by the H-I Model occurred in one year versus another year. The results would have been different if the years in which the H-I Model showed violations to have occurred were shifted, changed or "smoothed out."

The parties and the Special Master have thus, as a practical matter, used periods much less than ten years as accounting periods for use of the H-I Model to determine Compact compliance. Now Colorado is proposing to adopt a ten-year standard. There is no need to expand a period beyond what has been utilized up to this point by the parties and the Special Master.

5. Conclusion

Colorado has proposed a ten-year compliance accounting period, which has been recommended by the Special Master. If this recommendation is accepted, the critical Kansas right under the Arkansas River Compact to receive its water when the water is needed will have been substantially abrogated. The Compact provides for compliance within a period of one year or less, a principle which is manifested in a number of Compact provisions. The H-I Model, the standard for Compact compliance, like the standard in the Pecos River litigation and most things in life, is subject to some uncertainty. This uncertainty did

not dissuade the Court from enforcing the agreement of the States of New Mexico and Texas in the Pecos River litigation. It should not stop the Court from doing so here. Moreover, calculations of depletions and damages that depend upon the H-I Model have been determined on an annual basis throughout this litigation. There is no reason to extend the compliance period beyond the one year that has been used up to now.

D. This Court Should Not Rely on a Local Colorado Water Court to Determine Issues Critical to the Enforcement of Kansas' Compact Rights.

The Special Master recommends "[t]hat the final amounts of Replacement Plan credits to be applied toward Colorado's compact obligations shall be the amounts determined by the Colorado Water Court, and any appeals therefrom." Fourth Report 138. He goes on to say that such determination shall nevertheless be "subject to the right of Kansas to seek relief under the Court's original jurisdiction." *Id.*, at 138-139. These issues are critical to enforcement of Kansas' rights under the Compact. An overstated credit will result in Kansas' being deprived of water to which it is entitled.

There are strong reasons why this recommendation should not be accepted. The Constitution and federal statutes since the Judiciary Act of 1789 provide that this Court is the only federal court with jurisdiction to determine rights between States. U.S. CONST., art. III, § 2, cl. 2; 28 U.S.C. § 1251(a); *Mississippi v. Louisiana*, 506 U.S. 73 (1992). Further, this Court has stated emphatically that no State may be the judge in a case with another State. *West Virginia ex rel. Dyer v. Sims*, 341 U.S. 22 (1951). ("A State cannot be its own ultimate judge in a controversy with a

sister State. To determine the nature and scope of obligations as between States, whether they arise through the legislative means of compact or the 'federal common law' governing interstate controversies . . . is the function and duty of the Supreme Court of the Nation"). Yet the Special Master's proposal would assign the determination of issues critical to resolving a dispute between the States to a Colorado state court, in a proceeding to which Kansas is not even a party.

Most recently, the Court has said, "Where the States themselves are before this Court for the determination of a controversy between them, neither can determine their rights *inter sese* and this Court must pass upon every question essential to such a determination." *Oklahoma v. New Mexico*, 501 U.S. 221, 241 (1991) (quoting *Kentucky v. Indiana*, 281 U.S. 163, 176-177 (1930)). Moreover, any unilateral decree of the Colorado water court would not be binding on Kansas. *Hinderlider v. La Plata River & Cherry Creek Ditch Co.*, 304 U.S. 92, 102-103 (1938). Thus, issues essential to the determination of this case should be decided by this Court, either directly, with the assistance of the Special Master, for issues ready for resolution, or through a river master for issues that arise under the decree in the future.

The Special Master would have the Colorado water court in Pueblo, Colorado, determine replacement credits for the period 1997-1999 and thereafter. The quantification of credits will play an essential role in determining whether Kansas' rights under the Arkansas River Compact are protected. "To be sure, these various dry-up issues could be decided by the Supreme Court within the parameters of this case." Fourth Report 94. These matters have been the subject of the presentation of evidence and argument. As in *Oklahoma,* the Court, with the assistance

of the Special Master, should pass upon these questions as an essential part of the Court's determination of this case. See 501 U.S., at 241.

E. Colorado Did Not Comply with the Compact During the Period 1997-1999.

The Special Master has recommended that the Court find that Colorado complied with the Compact for the period 1997-1999. Fourth Report 137, ¶ 4. This recommendation depends on whether Compact compliance is to be measured over a period greater than one year as discussed elsewhere in this brief. In Kansas' view an accounting period longer than one year is not consistent with the Compact. Kansas' evidence, which was accepted by the Special Master for this purpose, showed a violation in 1997. See *id.*, at 24-32, App. 73.

F. The Special Master Should be Directed to Make Recommendations on All Issues Pending Before Him.

The Special Master has recommended that Compact compliance be determined "using the version of the model approved at the conclusion of this trial segment." Fourth Report 117-118. Yet the Special Master has made no recommendation in the Fourth Report on 15 issues currently pending before him that are necessary to implement the H-I Model or otherwise determine Compact compliance. These are issues on which evidence and argument have been submitted and which continue to be disputed between the States. Without a decision on the 15 disputed issues, it is not possible to implement an "approved" version of the Model or determine Compact compliance.

The pending disputed issues are listed below together with sample citations to the trial transcript, exhibits, briefs or the Fourth Report. They include the issues that the Special Master would shift to the Colorado Water Court for determination.

Disputed H-I Model Calibration Issues

1. Calibration procedures, parameters and criteria. Fourth Report 123-124; Kan. Op. Br. 47-54.

2. Canal capacities. Kan. Exh. 1093, at 41; Colo. Exh. 1411, at 25-26; Kan. Op. Br. 51-52.

3. Whether Colorado's use of altered diversion records should be rejected. RT Vol. 246 at 31-37.

4. Whether Colorado's use of statistical outliers in the streamflow data, including outliers previously excluded by the Special Master, should be rejected. RT Vol. 243 at 60-63; Kan. Opening Post-Trial Brief 53.

5. Representation of the Sisson-Stubbs water right. Fourth Report 92-95.

Disputed 1997-1999 Accounting Issues

6. Dry-up acreage. Fourth Report 92-95.

7. Sisson-Stubbs credit. *Ibid.*

8. Credit for winter water bookovers. Kan. Exh. 1093, at 17-18.

Disputed Future Compliance Issues

9. Dry-up acreage monitoring, verification and reporting requirement. Fourth Report 93.

10. Dry-up credits and return flow obligations for sources external to the model, including Highland Ditch and Fountain Creek. Kan. Op. Br. 73-75.

11. Whether Colorado can go beyond its precompact uses in claiming credit. Kan. Op. Br. 42-44.

12. Special waters monitoring, verification and reporting. Kan. Exh. 1093, at 20-25.

13. Timing of credit for winter water releases from Pueblo Reservoir. *Id.*, at 19-20.

14. Accounting procedures for Offset Account delivery credits. *Id.*, at 28-29; RT Vol. 241 at 17.

15. Article II consumptive use credit and return flow obligations. Kan. Op. Br. 73-75.

The resolution of these issues is necessary for determination of Compact compliance in the future. The evidence has been presented and the issues are ready for decision by the Special Master. Determination at this time will facilitate the drafting of a decree. Again, as the Court has ruled, "Where the States themselves are before this Court for the determination of a controversy between them, neither can determine their rights *inter sese* and this Court must pass upon every question essential to such a determination." *Oklahoma v. New Mexico*, 501 U.S. 221, 241 (1991) (quoting *Kentucky v. Indiana*, 281 U.S. 163, 176-177 (1930)).

IV. CONCLUSION

The exceptions of the State of Kansas to the Fourth Report of the Special Master should be sustained as follows: (1) a river master should be appointed to administer the

decree in this case; (2) prejudgment interest should begin to accrue in 1985 on damages found to be due at that time; (3) Colorado's ten-year compliance period proposal should be rejected as inconsistent with the Arkansas River Compact, and a one-year period should be adopted instead; (4) reliance on a local Colorado water court to quantify Colorado's credits under the Arkansas River Compact should be rejected; (5) Colorado should be found to have violated the Arkansas River Compact during the years 1997-1999; and (6) the Special Master should be directed to make recommendations on the issues pending before him.

Respectfully submitted,

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The Arkansas River Compact as Enacted by Congress 63 Stat. 145 (1949)

AN ACT

To grant the consent of the United States to the Arkansas River compact.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby given to the compact, signed (after negotiations in which a representative of the United States, duly appointed by the President, participated, and upon which he has reported to the Congress) by the Commissioners for the States of Colorado and Kansas on December 14, 1948, at Denver, Colorado, and thereafter ratified by the legislatures of each of the States aforesaid, which said compact reads as follows:

"ARKANSAS RIVER COMPACT

"The State of Colorado and the State of Kansas, parties signatory to this Compact (hereinafter referred to as 'Colorado' and 'Kansas', respectively, or individually as a 'State', or collectively as the 'States') having resolved to conclude a compact with respect to the waters of the Arkansas River, and being moved by considerations of interstate comity, having appointed commissioners as follows: 'Henry C. Vidal, Gail L. Ireland, and Harry B. Mendenhall, for Colorado; and George S. Knapp, Edward F. Arn, William E. Leavitt, and Roland H. Tate, for Kansas'; and the consent of the Congress of the United States to negotiate and enter into an interstate compact not later than January 1, 1950, having been granted by Public Law 34, 79th Congress, 1st Session, and pursuant thereto the

President having designated Hans Kramer as the representative of the United States, the said commissioners for Colorado and Kansas, after negotiations participated in by the representative of the United States, have agreed as follows:

"ARTICLE I

"The major purposes of this Compact are to:

"A. Settle existing disputes and remove causes of future controve.sy between the States of Colorado and Kansas, and between citizens of one and citizens of the other State, concerning the waters of the Arkansas River and their control, conservation and utilization for irrigation and other beneficial purposes.

"B. Equitably divide and apportion between the States of Colorado and Kansas the waters of the Arkansas River and their utilization as well as the benefits arising from the construction, operation and maintenance by the United States of John Martin Reservoir Project for water conservation purposes.

"ARTICLE II

"The provisions of this Compact are based on (1) the physical and other conditions peculiar to the Arkansas River and its natural drainage basin, and the nature and location of irrigation and other developments and facilities in connection therewith; (2) the o.inion of the United States Supreme Court entered December 6, 1943, in the case of Colorado v. Kansas (320 U.S. 383) concerning the relative rights of the respective States in and to the use of waters of the Arkansas River; and (3) the experience

derived under various interim executive agreements between the two States apportioning the waters released from the John Martin Reservoir as operated by the Corps of Engineers.

"ARTICLE III

"As used in this Compact:

"A. The word 'Stateline' means the geographical boundary line between Colorado and Kansas.

"B. The term 'waters of the Arkansas River' means the waters originating in the natural drainage basin of the Arkansas River, including its tributaries, upstream from the Stateline, and excluding waters brought into the Arkansas River Basin from other river basins.

"C. The term 'Stateline flow' means the flow of waters of the Arkansas River as determined by gaging stations located at or near the Stateline. The flow as determined by such stations, whether located in Colorado or Kansas, shall be deemed to be the actual Stateline flow.

"D. 'John Martin Reservoir Project' is the official name of the facility formerly known as Caddoa Reservoir Project, authorized by the Flood Control Act of 1936, as amended, for construction, operation and maintenance by the War Department, Corps of Engineers, later designated as the Corps of Engineers, Department of the Army, and herein referred to as the 'Corps of Engineers'. 'John Martin Reservoir' is the water storage space created by 'John Martin Dam'.

"E. The 'flood control storage' is that portion of the total storage space in John Martin Reservoir allocated to flood control purposes.

"F. The 'conservation pool' is that portion of the total storage space in John Martin Reservoir lying below the flood control storage.

"G. The 'ditches of Colorado Water District 67' are those ditches and canals which divert water from the Arkansas River or its tributaries downstream from John Martin Dam for irrigation use in Colorado.

"H. The term 'river flow' means the sum of the flows of the Arkansas and the Purgatoire Rivers into John Martin Reservoir as determined by gaging stations appropriately located above said Reservoir.

"I. The term 'the Administration' means the Arkansas River Compact Administration established under Article VIII.

"ARTICLE IV

"Both States recognize that:

"A. This Compact deals only with the waters of the Arkansas River as defined in Article III.

"B. This Compact is not concerned with the rights, if any, of the State of New Mexico or its citizens in and to the use in New Mexico of waters of Trinchera Creek or other tributaries of the Purgatoire River, a tributary of the Arkansas River.

"C. (1) John Martin Dam will be operated by the Corps of Engineers to store and release the waters of the

Arkansas River in and from John Martin Reservoir for its authorized purposes.

"(2) The bottom of the flood control storage is presently fixed by the Chief of Engineers, U.S. Army, at elevation 3,851 feet above mean sea level. The flood control storage will be operated for flood control purposes and to those ends will impound or regulate the streamflow volumes that are in excess of the then available storage capacity of the conservation pool. Releases from the flood control storage may be made at times and rates determined by the Corps of Engineers to be necessary or advisable without regard to ditch diversion capacities or requirements in either or both States.

"(3) The conservation pool will be operated for the benefit of water users in Colorado and Kansas, both upstream and downstream from John Martin Dam, as provided in this Compact. The maintenance of John Martin Dam and appurtenant works may at times require the Corps of Engineers to release water then impounded in the conservation pool or to prohibit the storage of water therein until such maintenance work is completed. Flood control operation may also involve temporary utilization of conservation storage.

"D. This Compact is not intended to impede or prevent future beneficial development of the Arkansas River basin in Colorado and Kansas by Federal or State agencies, by private enterprise, or by combinations thereof, which may involve construction of dams, reservoir, and other works for the purpose of water utilization and control, as well as the improved or prolonged functioning of existing works: Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially

depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction.

"ARTICLE V

"Colorado and Kansas hereby agree upon the following basis of apportionment of the waters of the Arkansas River:

"A. Winter storage in John Martin Reservoir shall commence on November 1st of each year and continue to and include the next succeeding March 31st. During said period all water entering said reservoir up to the limit of the then available conservation capacity shall be stored: Provided, that Colorado may demand releases of water equivalent to the river flow, but such releases shall not exceed 100 c. f. s. (cubic feet per second) and water so released shall be used without avoidable waste.

"B. Summer storage in John Martin Reservoir shall commence on April 1st of each year and continue to and include the next succeeding October 31st. During said period, except when Colorado water users are operating under decreed priorities as provided in paragraphs F and G of this Article, all water entering said reservoir up to the limit of the then available conservation capacity shall be stored: Provided, that Colorado may demand releases of water equivalent to the river flow up to 500 c. f. s., and Kansas may demand releases of water equivalent to that portion of the river flow between 500 c. f. s, and 750 c. f. s., irrespective of releases demanded by Colorado.

"C. Releases of water stored pursuant to the provisions of paragraphs A and B of this Article shall be made

upon demands by Colorado and Kansas concurrently or separately at any time during the summer storage period. Unless increases to meet extraordinary conditions are authorized by the Administration, separate releases of stored water to Colorado shall not exceed 750 c. f. s., separate releases of stored water to Kansas shall not exceed 500 c. f. s., and concurrent releases of stored water shall not exceed a total of 1,250 c. f. s.: Provided, that when water stored in the conservation pool is reduced to a quantity less than 20,000 acre-feet, separate releases of stored water to Colorado shall not exceed 600 c. f. s., separate releases of stored water to Kansas shall not exceed 400 c. f. s., and concurrent releases of stored water shall not exceed 1,000 c. f. s.

"D. Releases authorized by paragraphs A, B and C of this Article, except when all Colorado water users are operating under decreed priorities as provided in paragraphs F and G of this Article, shall not impose any call on Colorado water users that divert waters of the Arkansas River upstream from John Martin Dam.

"E. (1) Releases of stored water and releases of river flow may be made simultaneously upon the demands of either or both States.

"(2) Water released upon concurrent or separate demands shall be applied promptly to beneficial use unless storage thereof downstream is authorized by the Administration.

"(3) Releases of river flow and of stored water to Colorado shall be measured by gaging stations located at or near John Martin Dam and the releases to which Kansas is entitled shall be satisfied by an equivalent in Stateline flow.

"(4) When water is released from John Martin Reservoir appropriate allowances as determined by the Administration shall be made for the intervals of time required for such water to arrive at the points of diversion in Colorado and at the Stateline.

"(5) There shall be no allowance or accumulation of credits or debits for or against either State.

"(6) Storage, releases from storage and releases of river flow authorized in this Article shall be accomplished pursuant to procedures prescribed by the Administration under the provisions of Article VIII.

"F. In the event the Administration finds that within a period of fourteen (14) days the water in the conservation pool will be or is liable to be exhausted, the Administration shall forthwith notify the State Engineer of Colorado, or his duly authorized representative, that commencing upon a day certain within said fourteen (14) day period, unless a change of conditions justifies cancellation or modification of such notice, Colorado shall administer the decreed rights of water users in Colorado Water District 67 as against each other and as against all rights now or hereafter decreed to water users diverting upstream from John Martin Dam on the basis of relative priorities in the same manner in which their respective priority rights were administered by Colorado before John Martin Reservoir began to operate and as though John Martin Dam had not been constructed. Such priority administration by Colorado shall be continued until the Administration finds that water is again available in the conservation pool for release as provided in this Compact, and timely notice of such finding shall be given by the Administration to the State Engineer of Colorado or his

duly authorized representative: Provided, that except as controlled by the operation of the preceding provisions of this paragraph and other applicable provisions of this Compact, when there is water in the conservation pool the water users upstream from John Martin Reservoir shall not be affected by the decrees to the ditches in Colorado Water District 67. Except when administration in Colorado is on a priority basis the water diversions in Colorado Water District 67 shall be administered by Colorado in accordance with distribution agreements made from time to time between the water users in such District and filed with the Administration and with the State Engineer of Colorado or, in the absence of such agreement, upon the basis of the respective priority decrees, as against each other, in said District.

"G. During periods when Colorado reverts to administration of decreed priorities, Kansas shall not be entitled to any portion of the river flow entering John Martin Reservoir. Waters of the Arkansas River originating in Colorado which may flow across the Stateline during such periods are hereby apportioned to Kansas.

"H. If the usable quantity and available for use of the waters of the Arkansas River to water users in Colorado Water District 67 and Kansas will be thereby materially depleted or adversely affected, (1) priority rights now decreed to the ditches of Colorado Water District 67 shall not hereafter be transferred to other water districts in Colorado or to points of diversion or places of use upstream from John Martin Dam; and (2) the ditch diversion rights from the Arkansas River in Colorado Water District 67, and of Kansas ditches between the Stateline and Garden City shall not hereafter be increased beyond the

total present rights of said ditches, without the Administration, in either case (1) or (2), making findings of fact that no such depletion or adverse effect will result from such proposed transfer or increase. Notice of legal proceedings for any such proposed transfer or increase shall be given to the Administration in the manner and within the time provided by the laws of Colorado or Kansas in such cases.

"ARTICLE VI

"A. (1) Nothing in this Compact shall be construed as impairing the jurisdiction of Kansas over the waters of the Arkansas River that originate in Kansas and over the waters that flow from Colorado across the Stateline into Kansas.

"(2) Except as otherwise provided, nothing in this Compact shall be construed as supplanting the administration by Colorado of the rights of appropriators of waters of the Arkansas River in said State as decreed to said appropriators by the courts of Colorado, nor as interfering with the distribution among said appropriators by Colorado, nor as curtailing the diversion and use for irrigation and other beneficial purposes in Colorado of the waters of the Arkansas River.

"B. Inasmuch as the Frontier Canal diverts waters of the Arkansas River in Colorado west of the Stateline for irrigation uses in Kansas only, Colorado concedes to Kansas and Kansas hereby assumes exclusive administrative control over the operation of the Frontier Canal and its headworks for such purposes, to the same extent as though said works were located entirely within the State of Kansas. Water carried across the Stateline in the

Frontier Canal or another similarly situated canal shall be considered to be part of the Stateline flow.

"ARTICLE VII

"A. Each State shall be subject to the terms of this Compact. Where the name of the State or the term 'State' is used in this Compact these shall be construed to include any person or entity of any nature whatsoever using, claiming or in any manner asserting any right to the use of the waters of the Arkansas River under the authority of that State.

"B. This Compact establishes no general principle or precedent with respect to any other interstate stream.

"C. Wherever any State or Federal official or agency is referred to in this Compact such reference shall apply to the comparable official or agency succeeding to their duties and functions.

"ARTICLE VIII

"A. To administer the provisions of this Compact there is hereby created an interstate agency to be known as the Arkansas River Compact Administration herein designated as 'the Administration.'

"B. The Administration shall have power to:

"(1) Adopt, amend and revoke by-laws, rules and regulations consistent with the provisions of this Compact;

"(2) Prescribe procedures for the administration of this Compact: Provided, that where such procedures involve the operation of John Martin Reservoir Project

they shall be subject to the approval of the District Engineer in charge of said Project;

"(3) Perform all functions required to implement this Compact and to do all things necessary, proper or convenient in the performance of its duties.

"C. The membership of the Administration shall consist of three representatives from each State who shall be appointed by the respective Governors for a term not to exceed four years. One Colorado representative shall be a resident of and water right owner in Water Districts 14 or 17, one Colorado representative shall be a resident of and water right owner in Water District 67, and one Colorado representative shall be the Director of the Colorado Water Conservation Board. Two Kansas representatives shall be residents of and water right owners in the counties of Finney, Kearny or Hamilton, and one Kansas representative shall be the chief State official charged with the administration of water rights in Kansas. The President of the United States is hereby requested to designate a representative of the United States, and if a representative is so designated he shall be an ex-officio member and act as chairman of the Administration without vote.

"D. The State representatives shall be appointed by the respective Governors within thirty days after the effective date of this Compact. The Administration shall meet and organize within sixty days after such effective date. A quorum for any meeting shall consist of four members of the Administration: Provided, that at least two members are present from each State. Each State shall have but one vote in the Administration and every decision, authorization or other action shall require unanimous vote. In case of a divided vote on any matter

within the purview of the Administration, the Administration may, by subsequent unanimous vote, refer the matter for arbitration to the Representative of the United States or other arbitrator or arbitrators, in which event the decision made by such arbitrator or arbitrators shall be binding upon the Administration.

"E. (1) The salaries, if any, and the personal expenses of each member shall be paid by the government which he represents. All other expenses incident to the administration of this Compact which are not paid by the United States shall be borne by the States on the basis of 60 per cent by Colorado and 40 per cent by Kansas.

"(2) In each even numbered year the Administration shall adopt and transmit to the Governor of each State its budget covering anticipated expenses for the forthcoming biennium and the amount thereof payable by each State. Each State shall appropriate and pay the amount due by it to the Administration.

"(3) The Administration shall keep accurate accounts of all receipts and disbursements and shall include a statement thereof, together with a certificate of audit by a certified public accountant, in its annual report. Each State shall have the right to make an examination and audit of the accounts of the Administration at any time.

"F. Each State shall provide such available facilities, equipment and other assistance as the Administration may need to carry out its duties. To supplement such available assistance the Administration may employ engineering, legal, clerical, and other aid as in its judgment may be necessary for the performance of its functions. Such employees shall be paid by and be responsible

to the Administration, and shall not be considered to be employees of either State.

"G. (1) The Administration shall cooperate with the chief official of each State charged with the administration of water rights and with Federal agencies in the systematic determination and correlation of the facts as to the flow and diversion of the waters of the Arkansas River and as to the operation and siltation of John Martin Reservoir and other related structures. The Administration shall cooperate in the procurement, interchange, compilation and publication of all factual data bearing upon the administration of this Compact without, in general, duplicating measurements, observations or publications made by State or Federal agencies. State officials shall furnish pertinent factual data to the Administration upon its request. The Administration shall, with the collaboration of the appropriate Federal and State agencies, determine as may be necessary from time to time, the location of gaging stations required for the proper administration of this Compact and shall designate the official records of such stations for its official use.

"(2) The Director, U. S. Geological Survey, the Commissioner of Reclamation and the Chief of Engineers, U. S. Army, are hereby requested to collaborate with the Administration and with appropriate State officials in the systematic determination and correlation of data referred to in paragraph G (1) of this Article and in the execution of other duties of such officials which may be necessary for the proper administration of this Compact.

"(3) If deemed necessary for the administration of this Compact, the Administration may require the installation and maintenance, at the expense of water

users, of measuring devices of approved type in any ditch or group of ditches diverting water from the Arkansas River in Colorado or Kansas. The chief official of each State charged with the administration of water rights shall supervise the execution of the Administration's requirements for such installations.

"H. Violation of any of the provisions of this Compact or other actions prejudicial thereto which come to the attention of the Administration shall be promptly investigated by it. When deemed advisable as the result of such investigation, the Administration may report its findings and recommendations to the State official who is charged with the administration of water rights for appropriate action, it being the intent of this Compact that enforcement of its terms shall be accomplished in general through the State agencies and officials charged with the administration of water rights.

"I. Findings of fact made by the Administration shall not be conclusive in any court or before any agency or tribunal but shall constitute prima facie evidence of the facts found.

"J. The Administration shall report annually to the Governors of the States and to the President of the United States as to matters within its purview.

"ARTICLE IX

"A. This Compact shall become effective when ratified by the Legislature of each State and when consented to by the Congress of the United States by legislation providing substantially, among other things, as follows:

"'Nothing contained in this Act or in the Compact herein consented to shall be construed as impairing or affecting the sovereignty of the United States or any of its rights or jurisdiction in and over the area or waters which are the subject of such Compact: Provided, that the Chief of Engineers is hereby authorized to operate the conservation features of the John Martin Reservoir Project in a manner conforming to such Compact with such exceptions as he and the Administration created pursuant to the Compact may jointly approve.'

"B. This Compact shall remain in effect until modified or terminated by unanimous action of the States and in the event of modification or termination all rights then established or recognized by this Compact shall continue unimpaired.

"In Witness whereof, The commissioners have signed this Compact in triplicate original, one of which shall be forwarded to the Secretary of State of the United States of America and one of which shall be forwarded to the Governor of each signatory State.

"Done in the City and County of Denver, in the state of Colorado, on the fourteenth day of December, in the Year of our Lord One Thousand Nine Hundred and Forty-eight.

Henry C. Vidal
Gail L. Ireland
Harry B. Mendenhall
Commissioners for Colorado

George S. Knapp
Edward F. Arn
William E. Leavitt
Roland H. Tate
Commissioners for Kansas

"Attest:
"Warden L. Noe, Secretary

"Approved:
"Hans Kramer
Representative of the United States"

SEC. 2. Nothing contained in this Act or in the compact herein consented to shall be construed as impairing or affecting the sovereignty of the United States or any of its rights or jurisdiction in and over the area or waters which are the subject of such compact: *Provided,* That the Chief of Engineers is hereby authorized to operate the conservation features of the John Martin Reservoir project in a manner conforming to such compact with such exceptions as he and the Administration created pursuant to the compact may jointly approve.

Approved May 31, 1949.

TEXAS EXHIBIT NO. 108

THE PECOS RIVER MASTER'S MANUAL

November 30, 1987

INTRODUCTION

This manual contains the procedures to be used by the River Master to make the calculations provided for in the decree of the United States Supreme Court in Texas vs. New Mexico, No. 65 Original. These calculations include determinations of negative or positive departures from New Mexico's delivery obligation.

The computational procedures and the computer programs required to make the computations are described in detail in Texas Exhibit No. 79.

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A-3 Gage Height-Area-Capacity Tables for Santa Rosa Reservoir, Published by U.S. Corps. of Engineers, August 1980.

MANUAL OF PROCEDURES TO COMPUTE PECOS RIVER COMPACT COMPLIANCE

A. General

1. The so-called "annual flood inflow" for the Alamogordo Dam[1] to state line reach is defined as the sum of the measured flow of the Pecos River below Alamogordo Dam plus the estimated flood inflows from the Alamogordo Dam to Artesia, Artesia to Carlsbad and Carlsbad to state line reaches. The current year's "annual flood inflow" is averaged with the annual flood inflows for the two prior years. This three-year average quantity is termed the "Index Inflow" and is used as "x" in the equation

$$y = 0.0489892\ (x)^{1.42318}$$

in order to determine the index outflow "y," New Mexico's three- year average 1947 condition delivery obligation at the New Mexico- Texas state line. This index inflow-index outflow equation was approved June 11, 1984 by the U.S. Supreme Court in the Texas vs. New Mexico Pecos River Compact Litigation, No. 65 Original. This equation will be used to determine New Mexico's 1947 condition delivery obligation imposed by the Pecos River Compact. A comparison of the index outflow with the three year average historical outflow will identify any delivery depletions from the 1947 condition which might have occurred.

[1] On October 17, 1974, Alamogordo Dam was renamed Sumner Dam by the U.S. Congress under Public law 93-447, but for purposes of this manual, Sumner Dam has been usually referenced as Alamogordo Dam.

2. There are several factors which, under terms of the Pecos River Compact, might at times increase or decrease New Mexico's obligation to deliver Pecos River water at state line. When appropriate, the following factors may need to be employed to adjust the computed departures in the Compact compliance computations:

   a. Adjustments for Depletions above Alamogordo Dam

   b. Depletions due to McMillan Dike

   c. Salvage Water in New Mexico

   d. Unappropriated Flood Waters

   e. Texas Water Stored in New Mexico Reservoirs

   f. Beneficial Consumptive Use of Waters of Delaware River by Texas

B. Procedures to Compute Departures of State Line Flows of the Pecos River from the 1947 Condition

   1. General

      a. Compute Index Inflow, Alamogordo Dam to New Mexico-Texas state line as follows:[2]

      (1). The annual flood inflow is computed as follows:

         (a) Gaged flow of the Pecos River below Alamogordo Dam, plus

[2] All computations are to be performed in units of 1,000 acre-feet rounded to the nearest 100 acre-feet.

(b) Computed flood inflow, Alamogordo Dam to Artesia reach, plus

(c) Computed flood inflow, Artesia to Carlsbad reach, plus

(d) Computed flood inflow, Carlsbad to state line reach.

(2) The Index inflow for one year is the average of the annual flood inflow for that year plus the annual flood inflows for the two prior years.

b. Determine New Mexico's 1947 condition delivery obligation at the New Mexico-Texas state line (Index Outflow). The 1947 condition index outflow is determined by the equation:

$$y = 0.0489892 (X)^{1.42318}$$

where (X) is the index inflow and Y is the 1947 condition outflow in units of 1,000 acre-feet.

c. Determine the three-year running average historical outflow at the New Mexico-Texas state line.

(1) The annual historical outflow is computed as follows:

(a) Gaged flow of the Pecos River at Red Bluff, New Mexico.

(b) Gaged flow of the Delaware River near Red Bluff, New Mexico.

(2) The three-year average historical outflow for any year is the average of the annual historical outflow for that year and the two prior years.

d. Compute annual departures of state line flows of the Pecos River from the 1947 condition. Compute each annual departure by subtracting the annual 1947 condition delivery obligation (index outflow) from the corresponding three-year average historical outflow. Add algebraically the adjustments to the computed departures as determined under the provisions in Part C herein. A negative departure indicates an underdelivery at state line and a positive departure indicates an overdelivery.

Figure 1 shows the approximate boundary of the Pecos River Basin from its headwaters in New Mexico to the gaging station of the Pecos River near Girvin, Texas. Figures 2, 3 and 4 are stick diagrams of the main stem of the Pecos River showing important tributaries, gaging stations, diversion facilities and reservoirs in New Mexico and Texas.

[Figure 1 Omitted]

[Figure 2 Omitted]

[Figure 3 Omitted]

[Figure 4 Omitted]

2. Determination of Alamogordo Reservoir Releases and Spills

Use the monthly United States Geological Survey (USGS) streamflow records for the gaging station, Pecos River below Alamogordo Dam, as the measure of releases and spills from the reservoir.

3. Determination of Flood Inflows, Alamogordo Dam to Artesia

The computational items used to estimate the flood inflows to this 197.8 river mile reach of the Pecos River are listed below, followed by an explanation for each computation to be made. Monthly quantities for each item will be measured or computed, and the annual quantity will be the sum of the monthly quantities.

Streamflow below Alamogordo Dam (see 3.a. below).
Fort Sumner Irrigation District diversion (see 3.b. below)
Fort Sumner irrigation District return flow (see 3.c. below)
Streamflow past Fort Sumner Irrigation District (see 3.d. below)
Channel loss, Alamogordo Dam to Acme (see 3.e. below)
Computed Residual Flow at Acme (see 3.f. below)
Base inflow, Acme to Artesia (see 3.g. below)
River pump depletions, Acme to Artesia, (see 3.h. below)
Residual Flow at Artesia (see 3.i. below)
Streamflow, Pecos River near Artesia (see 3.j. below)
Flood inflow, Alamogordo Dam to Artesia (see 3.k. below)

a. Streamflow Below Alamogordo Dam

Use the monthly USGS streamflow records for the gaging station, Pecos River below Alamogordo Dam, N.M.

b. Fort Sumner Irrigation District Diversion

Use the monthly USGS discharge records for the gaging station, Fort Sumner Main Canal near Fort Sumner, N.M.

c. Fort Sumner Irrigation District Return Flow

Use 53 percent of the total annual diversion (item b. above) and distribute on a monthly basis as follows:

MONTH	J	F	M	A	M	J	J	A	S	O	N	D
PERCENT	4	3	7	8	12	12	12	12	11	10	5	4

d. Streamflow Past Fort Sumner Irrigation District

From the streamflow below Alamogordo Dam (Item 3.a.), subtract the Fort Sumner Irrigation District diversions (Item 3.b.), and add the Fort Sumner Irrigation District return flows (Item 3.c.). Whenever the computed flow past the District is less than the return flow, set the flow past the District (Item 3.d.) equal to the return flow (Item 3.c.).

e. Channel Loss, Alamogordo Dam to Acme

Compute the monthly river channel losses using the equations below, where X is the flow past the Fort Sumner Irrigation District in units of 1000 acre-feet (Item 3.d.). Whenever the computed loss exceeds the calculated flow past the District, the channel loss (Item 3.e.) is set equal to the flow past the District (Item 3.d.). Any computed negative channel loss is set equal to zero.

Month	Channel Loss "L" by Month in 1000 Acre-Feet
Jan, Feb, Dec	L = 0.404X - 0.033
Mar	L = 0.172X + 0.324
Apr, May	L = 0.117X + 1.142
Jun	L = 0.173X + 0.998
Jul	L = 0.157X - 0.182
Aug	L = 0.109X + 1.295
Sep, Oct	L = 0.129X + 0.456
Nov	L = 0.233X + 0.078

f. Computed Residual Flow at Acme

Item 3.d.-Item 3.e.

g. Base Inflow, Acme to Artesia

Use the monthly base inflow quantities determined and furnished by the USGS.

h. River Pump Depletion, Acme to Artesia

Use monthly river pump diversion quantities compiled by USGS based upon river pumping from the Pecos River in the Acme to Artesia reach as reported by the New Mexico Pecos River Water Master.

i. Residual Flow at Artesia

Item 3.f. + Item 3.g.-Item 3.h.

j. Steamflow [sic] , Pecos River near Artesia

Use the monthly USGS streamflow records for the gaging station, Pecos River near Artesia, N.M.

k. Flood Inflow, Alamogordo Dam to Artesia

Item 3.j.-Item 3.i.

Table 1 shows sample computations for years 1982 and 1983 extracted from Texas Exhibit 79.

4. Determination of Flood Inflows, Artesia to Carlsbad

The computational items used to estimate the flood inflows for this 45.3 river mile reach of the Pecos River are listed below, followed by an explanation of each computation to be made. Monthly quantities for each item will be measured or computed, and the annual quantities will be the sum of the monthly quantities.

Steamflow [sic], Pecos River near Artesia (see 4.a. below)
Major Johnson Springs (new water) (see 4.b. below)
Carlsbad Springs (new water) (see 4.c. below)
Total inflow (see 4.d. below)
Channel losses (see 4.e. below)
Evaporation losses (see 4.f. below)
Change in storage (see 4.g. below)
Net Carlsbad Irrigation District diversions (see 4.h. below)
Other depletions (see 4.i. below)
Steamflow [sic], Pecos River at Carlsbad (see 4.j. below)
Total outflow (see 4.k. below)
Total Flood inflow, Artesia to Carlsbad (see 4.l. below)

[Table 1 Omitted]

a. Streamflow, Pecos River near Artesia

Use the monthly USGS streamflow records for the gaging station, Pecos River near Artesia, N.M. (Same as Item 3.j.)

b. Major Johnson Springs (New Water)

(1) Use the equation (X) = 22.737-0.1578 (Y) to compute the summer new water discharge rate at Major Johnson Springs, where (X) is the average summer new water discharge rate in cfs and (Y) is the average summer depth in feet below land surface to water level in well 20.26.8.1211 for the months of July, August and September as measured by the USGS.

(2) Compute the monthly new water discharge rates using the following equations:

Months	Rate
Jan, Feb, Mar	X + 5.0 cfs
Apr, May, Jun	X + 2.5 cfs
Jul, Aug, Sep	X
Oct, Nov, Dec	X + 2.5 cfs

wherein X is the new water discharge rate computed in 4.b.(1) above.

Convert the new water discharge rates to units of 1,000 acre-feet each month.

(3) Once Brantley Reservoir begins impounding water, compute the Major Johnson Springs new water by the water balance technique using the following factors in addition to reservoir evaporation, content changes and diversions:

(a) Gaged inflows into and outflows (including spills and releases) from Brantley Reservoir and;

(b) Losses and gains to Brantley Reservoir bank storage by piezometric measurements.

If the above data are not available, the Major Johnson Springs new water shall be assumed to be 8200 acre-feet per year for the water years 1988 and 1989. If the gages and piezometers have not been installed by January 1, 1989, the River Master shall have the gages and piezometers installed and shall bill the expenses of the installation to the states.

c. Carlsbad Springs New Water

(1) use the following procedure to compute the monthly new water discharge quantities rounded to the nearest 100 acre-feet.

(a) Use the annual streamflow records (expressed in cfs) furnished by the USGS for the gaging station, Pecos River below Dark Canyon, at Carlsbad, N.M.

(b) Subtract tributary inflow from Dark Canyon Draw, furnished by USGS at Dark Canyon Draw at Carlsbad gaging station.

(c) Subtract releases and spills from Lake Avalon which are furnished by USGS for gaging station, Pecos River Below Avalon Dam, N.M.

(d) Add 2 cfs for the annual depletions from the Pecos River from the Carlsbad canal flume to the Carlsbad gage. These depletions are caused by the power plant consumptive use, evaporation from Tansill and Bataan Lakes, and all diversions, including the Carlsbad golf course, F. V. Dowling and E. J. Hines.

(e) Subtract the lagged seepage from the main CID canal in cfs which is computed to be 7 percent of the CID diversions measured at Avalon Dam by USGS for gaging station, Carlsbad Main Canal at Head, Carlsbad, N.M. This seepage will have a lagged distribution as follows: one-half in the current quarter; one-third in the following quarter; and one-sixth in the next quarter.

(f) Subtract one cfs to represent the average annual return flow from surface water irrigation between Avalon Dam and the gaging station Pecos River at Carlsbad.

(g) Subtract lagged leakage from Lake Avalon. The leakage from Lake Avalon is estimated by using the mean monthly gage height (H) in feet for Lake Avalon (published by USGS for Lake Avalon Near Carlsbad, N.M.), in the equation: Avalon leakage in cfs = 4.78 (H)-62.0. One-half of the leakage is assumed to appear at Carlsbad Springs during the current

quarter, with one-third to appear during the following quarter and one-sixth during the next quarter.

(h) Subtract 3 cfs to represent the average seepage loss from the Pecos River in the reach between Major Johnson Springs and Dam site No. 3 gage.

(i) The annual new water in cfs is: (a)-(b)-(c)+(d)-(e)-(f)-(g)-(h).

(j) Convert the new water in cfs, item (i), above, to units of 1000 acre-feet, and distribute equally to each month of the year.

B.4. d. Total Inflow

This is the sum of Items B.4.a., B.4.b. and B.4.c.

e. Channel Losses

Compute the monthly river channel losses using the equation (Y) = 0.2165(X)-0.3845, where (Y) is the monthly river channel loss and (X) is the monthly flow of the Pecos River at Artesia in units of 1000 acre-feet (Item 4.a.).
Whenever the computed loss exceeds the flow of the Pecos River at Artesia, the calculated loss is set equal to the flow at Artesia. The maximum loss during any one month is limited to 14,300 acre-feet.

f. Evaporation Loss

(1) Compute the total monthly evaporation loss by multiplying the monthly net

evaporation rates times the average monthly surface areas for Lake Avalon and Lake McMillan and adding the two quantities.[3]

(2) Use the USGS elevation, area and capacity relationships for Lake Avalon and Lake McMillan Reservoirs to estimate the average monthly surface area for each reservoir.[3] The 1984 area-capacity table for Lake McMillan (Table 2) is to be used until a revised area-capacity table becomes available

[Table 2 Omitted]

[Table 3 Omitted]

and is approved for use. The 1982 area-capacity table based on the 1979 United States Bureau of Reclamation (USBR) sediment survey for Lake Avalon (Table 3) is to be used until a revised area-capacity table based on a new sediment survey performed by the USBR, the U.S. Army Corps of Engineers, USGS, U.S. Soil Conservation Service or a state-registered engineer is available.

Gage height-area-capacity tables for Brantley Reservoir are shown in Appendix A-2 to this Manual.

[3] When Brantley Reservoir begins impounding water, the evaporation loss and storage change shall be computed for both Brantley and McMillan Reservoirs until the McMillan Dam is breached and no water is stored in McMillan Reservoir after which only Brantley Reservoir will be considered.

B.4.f. (3) Use U.S. Weather Bureau evaporation data for Lake Avalon and precipitation data for Artesia and Lake Avalon. Missing evaporation data are to be computed using the following equation:

$$E_L = 2.5 \left[\frac{p}{100} T \frac{(114-H)}{100} - 0.6 \right]$$

where E_L is the lake evaporation rate in inches; "p" is the percentage of daytime hours at the approximate latitude of McMillan and Avalon Reservoirs, as given in the table below; "T" is the mean monthly temperature in °F average of Artesia and Carlsbad; "H" is the average percent humidity for the month computed from the data at 5AM, 11AM, 11PM furnished by the U.S. Weather Bureau.

Table of Percentage of Daytime Hours for McMillan & Avalon Reservoirs

Jan	Feb	Mar	Apr	May	Jun
7.17	6.95	8.36	8.76	9.65	9.62
Jul	Aug	Sep	Oct	Nov	Dec
9.80	9.29	8.34	7.92	7.08	7.02

(a) If Lake Avalon evaporation data are not available, and humidity data at Roswell and other data are not available for estimating evaporation at Lake Avalon and there is not more than one month missing between months for which data are available, estimate the evaporation by interpolation between monthly data. If complete evaporation data are missing for more than two consecutive months and data for all of the above described

methods are not available, find the average daily evaporation that is published for that month and estimate total evaporation by multiplying the average daily evaporation times the number of days in the month.

(b) If precipitation data at Lake Avalon are not available, use Carlsbad precipitation; if Carlsbad precipitation is not available, use the precipitation data at Carlsbad Federal Aeronautic Administration Airport.

(c) Pan evaporation as determined at Lake Avalon is converted to lake surface evaporation by applying a factor of 0.77 and reducing it by the precipitation at Lake Avalon for obtaining the net evaporation rate at Lake Avalon.

For Lake McMillan, the computed lake evaporation rate of Lake Avalon is reduced by the average precipitation at Artesia and Lake Avalon.[4] The computed net evaporation rates are then converted from inches to feet.

g. Change in Storage

Use change in storage data from USGS gage height records for Lake Avalon near Carlsbad, N.M. and for Lake McMillan[5] near

[4] In the future, if pan evaporation data are available at the Brantley Dam site, use these data in estimating the evaporation rates. If data are not available for Brantley Reservoir, use the procedures described in B.4.f.

[5] See Footnote 3

Lakewood, N.M. and using gage height-area-capacity data shown in Tables 2 and 3.

h. Net Carlsbad Irrigation District Diversions

Use 93 percent of the USGS published records for the gaging station, Carlsbad Main Canal at Head, Near Carlsbad, N.M.

i. Other Depletions

(1) For other depletions referenced in B.4.c. (1) (d) add 100 acre-feet for all months except July and August.
and 200 acre-feet for July and August.

(2) Add any depletions as determined by the USGS caused by Brantley Reservoir and due to loss of water to underground aquifers and to the bank storage.

j. Streamflow, Pecos River at Carlsbad

Use the USGS gaging station records for Pecos River below Dark Canyon, at Carlsbad, NM, minus the gaged streamflow at the USGS gaging station, Dark Canyon Draw at Carlsbad, NM.

In 1970, the USGS discontinued the gaging station Pecos River at Carlsbad, NM, and moved it to a new site about 0.8 mile downstream. The new "Carlsbad gage" was renamed Pecos River below Dark Canyon Draw and it now measures tributary inflow from Dark Canyon Draw that was not previously measured at the Carlsbad site. The total flow of Dark Canyon must be subtracted from the total flow Pecos River below Dark Canyon Draw in order to arrive at the equivalent total flow at the old location at Carlsbad. This subtracted

amount will be added as part of flood inflow in Carlsbad to state line reach.

k. Total Outflow

This is the algebraic sum of Items B.4.e., B.4.f., B.4.g., B.4.h., B.4.i. and B.4.j.

l. Flood Inflow, Artesia to Carlsbad

Determine this quantity by subtracting the total inflow, Item B.4.d., from the total outflow, Item B.4.k.

Table 4 shows sample computations for years 1982 and 1983 extracted from Exhibit No. 79.

B.5. Determination of Flood Inflows, Carlsbad to New Mexico-Texas State Line

Because of the lack of sufficient data to accurately compute flood inflow in the Carlsbad to state line reach by the inflow-outflow method, the flood inflow for this reach is to be determined by the hydrograph scalping method. Figure 5 shows the factors to be considered in scalping flood flows from the hydrographs. The computational items used to estimate flood inflows to this 54 river mile reach of the Pecos River are listed below, followed by an explanation of each computation to be made. Monthly quantities for each item will be computed from daily streamflow quantities. The annual quantities will be the sum of the computed monthly flood inflow quantities.

Flood inflow, Carlsbad to state line not including Delaware River flood inflow (see a. below)

Flood inflow, Delaware River (see b. below) —

Total flood inflow, Carlsbad to state line (see c. below)

[Table 4 Omitted]

a. Flood Inflow, Carlsbad to USGS Gage at Red Bluff, N.M.

Use the following procedure

(1) Prepare daily hydrographs for the USGS gaging station Pecos River below Dark Canyon, at Carlsbad, New Mexico, and Pecos River at Red Bluff, New Mexico and identify apparent flood inflows by hydrograph scalping techniques.

(2) Compute the flood inflows occurring between the upstream and downstream gaging stations as the difference between the scalped flood flow quantities of the two hydrographs; however, flood inflows are only considered when 0.05 inches or more of precipitation has occurred within the reach. Add the gaged flows of Dark Canyon Draw to the scalped flood inflows.

b. Flood Inflow, Delaware River

Use the daily records furnished by the USGS for the gaging station, Delaware River near Red Bluff, N.M. and select flood inflows by inspection of daily data.

c. Flood Inflow, Carlsbad to state Line

Add the estimated flood inflows from item 5.a. to that quantity determined in item 5.b.

[Figure 5 Omitted]

C. Adjustments to Computed Departures

1. Adjustments for Depletions Above Alamogordo Dam

a. Depletions Due to Irrigation

(1) In computing the total irrigated acreage in the Upper Reach, above Alamogordo Dam, to which surface and/or groundwater has been applied during any time of the year, use the irrigated acreage shown on the most recent irrigation inventory as reported by New Mexico. If any water right acreage in the Upper Reach is converted to another use, the depletion will be computed as if the use was irrigation use.

(2) Determine the consumptive use of irrigated acreage by multiplying the irrigated acreage determined in 1.a.(1) by the unit depletion rate for the year in question in acre-feet/acre. The unit depletion rate is determined as follows:

(a) Tabulate the monthly precipitation furnished for the Las Vegas Federal Aviation Administration Airport, Pecos Ranger Station and Santa Rosa for the months April through October. Find the effective precipitation for each station for each month using Figure A-7-2, page 7-11, of Stipulated Exhibit No. 8.

(b) Compute the average effective precipitation of the three stations

for each month in inches. Convert the monthly effective precipitation in inches to feet.

(c) Using the following distribution of monthly unit consumptive use of 1.77 acre-feet per acre, subtract the estimated effective precipitation determined in Step 2 from the monthly unit consumptive use.

DISTRIBUTION OF MONTHLY UNIT CONSUMPTIVE USE[6]

(acre-feet per acre)

Apr	May	Jun	Jul	Aug	Sept	Oct	TOTAL
.19	.36	.36	.30	.27	.18	.11	1.77

(d) If the monthly effective precipitation estimated in Step 2 equals or exceeds the total monthly consumptive use, set the streamflow depletion equal to zero. If the monthly effective precipitation is less than the consumptive use, the difference is the streamflow depletion. Add the estimated streamflow depletion computed each month April through October to determine the annual streamflow depletion rate to be applied to the historic irrigated acreage for the water year.

[6] Monthly distribution of 1.77 acre-feet annual consumptive use calculated from table shown on page 41 of Stipulated Exhibit 11b.

(e) Multiply the streamflow depletion rate determined in Step 4 by the irrigated acreage for the water year to determine the total streamflow depletion of the irrigated lands in the upper reach.

(3) Compare the 1947 condition irrigation consumptive use (14,600 acres x 0.74 acre-feet/acre = 10,804 acre-feet per year) with Item (2). If the 1947 condition use exceeds the actual use during the year computed in (2), the gaged streamflow below Alamogordo Dam will be reduced by the difference.

If the actual use computed in (2) exceeds the 1947 condition use, i.e., 10,804 acre-feet per year, then add the difference to the gaged streamflow below Alamogordo Dam.

Recompute New Mexico's 1947 condition delivery obligation and departures at the state line using the revised streamflow of Pecos River below Alamogordo Dam.

b. Depletions Due to Operation of Santa Rosa Reservoir

(1) Determine the average monthly contents of Santa Rosa and Alamogordo Reservoirs and add these two contents to obtain the sum of contents. Use the gage height-area-capacity tables for each reservoir as shown in Appendices A-1 and A-3 of this Manual.

(a) Use the latest gage height-area-capacity Tables for Alamogordo Reservoir as published by U.S. Bureau of Reclamation and in Appendix A-1 to this Manual until another survey is undertaken and area-capacity Tables are published by the U.S. Bureau of Reclamation.

(b) Use the latest gage height-area-capacity Tables for Santa Rosa Lake (Lake Los Esteros) as published by the U.S. Army Corps of Engineers, Albuquerque District, August 1980, and extracted and shown in Appendix A-3 to this Manual, and currently being used by the USGS until another sediment survey is undertaken and area-capacity Tables published.

(2) Compute the monthly historic evaporation losses from Alamogordo Reservoir using the historic average surface area of Alamogordo Reservoir by multiplying it by the net evaporation rate at Alamogordo Dam. Compute the monthly net evaporation rate at Alamogordo Dam at 0.77 times the monthly pan evaporation rate at Alamogordo Dam minus the monthly precipitation at Alamogordo Dam.

(3) Compute the monthly historic evaporation losses from Lake Santa Rosa using the historic average surface area of Lake Santa Rosa multiplying it by the net monthly evaporation rate at Lake Santa Rosa. Compute the net monthly

evaporation rate at Lake Santa Rosa as 0.77 times the monthly pan evaporation rate at Lake Santa Rosa minus the monthly precipitation at Lake Santa Rosa.

New Mexico is to provide the pan evaporation and precipitation data for Lake Santa Rosa and Alamogordo Reservoir.

(4) Add the two net monthly historic evaporation losses from Alamogordo and Santa Rosa Reservoirs computed in (2) & (3) above.

(5) Compute the 1947 condition net monthly evaporation loss from Alamogordo Reservoir by assuming its contents equal to the total historic contents of Lake Santa Rosa and Alamogordo Reservoir determined in (1) above. Use the same net evaporation rate from Alamogordo Reservoir as computed in (2) above. (Use Table 3 of Texas Exhibit 68 for Alamogordo Reservoir.)

(6) Subtract 1947 condition net monthly evaporation loss from Alamogordo Reservoir computed in (5) from the total historic net monthly evaporation loss from Alamogordo and Santa Rosa Reservoirs computed in (4) above. Add the 12 monthly values algebraically to make the annual adjustment for excess evaporation.

(7) Compute the excess water held in these two reservoirs during the year over and above the 1947 condition storage of

129,300 acre-feet by the following procedure:

(a) Determine the end of the year combined contents of Santa Rosa and Alamogordo Reservoirs for the current year and the previous year. If both quantities are equal or less than 129,300 acre-feet then the adjustment for excess storage is zero;

(b) If both end of year combined contents are in excess of 129,300 acre-feet, then subtract algebraically the previous year's combined end of year contents from the current year's combined end of year contents;

(c) If the current year's end of year combined contents are less than 129,300 acre-feet and the previous year's end of year combined contents are in excess of 129,300 acre-feet, then subtract algebraically the previous year's combined end of year contents from 129,300 acre-feet; and

(d) If the current year's end of year combined contents are in excess of 129,300 acre-feet but the previous year's end of year combined contents are less than 129,300 acre-feet, then subtract 129,300 acre-feet from the current year's combined end of year contents.

(8) Add algebraically the adjustment for excess evaporation loss computed in

(6) above to the adjustment for excess storage held in these two reservoirs, computed in (7) above.

(9) Add algebraically the adjustment computed in (8) to the annual gaged flow below Alamogordo Dam for computing the index inflows.

(10) Recompute New Mexico's 1947 condition delivery obligation and departures at the state line using the adjusted index inflows.

c. Transfer of Water Use by New Mexico to the Upper Reach Upstream from Alamogordo Dam

Add to the streamflow of Pecos River below Alamogordo Dam, the effect of the amount of water diverted by New Mexico upstream of Alamogordo Dam transferred from the reach below Alamogordo Dam to the state line as reported by New Mexico. If the amount of the diversions is not furnished by New Mexico by March 1, each year, assume the diversion equals the amount of water authorized for transfer in the permit.

Recompute New Mexico's 1947 condition delivery obligation and departures at the state line using the revised streamflow of Pecos River below Alamogordo Dam.

2. Depletions Due to McMillan Dike

Credit the computed departures in B.1.d. with the quantities of depletions caused by the McMillan Dike.

Compute the depletions caused by the McMillan Dike using the following procedures:

a. Use the Alamogordo Dam to New Mexico-Texas state line index inflow computed in B.1.a(2) for the computation year and compute the 1947 condition outflow with McMillan Dike using the following equation:

$$Y=0.046399\ (X)^{1.430603}$$

Where (X) is the index inflow and Y is the 1947 condition outflow in units of 1000 acre-feet.

b. Subtract the outflow computed in 2.a above from the outflow quantity computed in B.1.b.

c. Credit the departures in state line flows computed in B.1.d by the quantity computed in 2.b above.

3. Salvage Water Analysis Criteria and Procedures

a. The term "water salvaged" means that quantity of water which may be recovered and made available for beneficial use and which quantity of water under the 1947 condition was non-beneficially consumed by natural processes.

b. The water salvaged in New Mexico, measured at or near Avalon Dam, through the construction and operation of a project or projects by the United States or by joint undertakings of Texas and New Mexico is apportioned by the Compact as follows: forty-three percent (43%) to Texas and fifty-seven percent (57%) to New Mexico.

c. Any other water salvaged by New Mexico is apportioned by the Compact to New Mexico but will not have the effect of diminishing the quantity of water available to Texas under the 1947 condition. Therefore, the annual Compact compliance computations are only concerned with the water salvage resulting from projects participated in by the United States or from joint Texas-New Mexico projects.

d. Study each water salvage project participated in by the United States and/or each joint Texas-New Mexico project. Determine the amount of water salvaged, if any, and convert to a three year running average quantity.

e. Route the water salvaged from place of occurrence to Avalon Dam, considering only non-beneficial consumption by natural processes. Forty-three percent (43%) of the routed water salvaged reaching Avalon Dam is apportioned to Texas. Add the total quantity of water salvaged that is apportioned to Texas to the delivery obligation of New Mexico at the New Mexico-Texas state line.

4. Unappropriated Flood Waters Analysis Criteria and Procedures

   The River Master shall determine and apportion any unappropriated flood waters using methodologies not inconsistent with applicable provisions of the Compact and this Manual.

5. Texas Water Stored in New Mexico Reservoirs.

   If a quantity of the Texas allocation is stored in facilities constructed in New Mexico at the

request of Texas, then, to the extent not inconsistent with the conditions imposed pursuant to Article IV(e) of the Compact, this quantity will be reduced by the amount of reservoir losses attributable to its storage, and, when released for delivery to Texas, the quantity released less channel losses is to be delivered by New Mexico at the New Mexico-Texas state line.

6. Beneficial Consumptive Use of Waters of Delaware River by Texas.

   Add to the computed departures at the New Mexico-Texas state line the amount of beneficial consumptive use of waters of the Delaware River by Texas. These uses shall be furnished by Texas by March 1 each year.

[Appendices omitted from Kan. Exh. 1104]

No. 65, Original

IN THE
SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1990

STATE OF TEXAS, Plaintiff,

v.

STATE OF NEW MEXICO, Defendant.

Office of the River Master: Neil S. Grigg

MODIFICATION DETERMINATION NEW MEXICO'S AMENDED FIRST MOTION TO MODIFY THE RIVER MASTER'S MANUAL

New Mexico's Amended First Motion to Modify the River Master's Manual, dated December 9, 1988, is to modify Section B.3.g as follows:

B.3.g. Base Flow, Acme to Artesia

Use the monthly base inflow quantities determined [and furnished by the USGS] following the procedures used in Texas Exhibit 68. (Text in brackets to be deleted; text underlined to be added to the original motion)

Modification Determination.

The River Master amends this Motion by replacing the existing Section B.3.9 [sic] with new and amended language as follows:

B.3.g. Base Flow, Acme to Artesia

For the River Master's Preliminary Report use the monthly base inflow quantities determined and furnished

by the USGS. USGS will utilize the best available data and methods to estimate the total monthly base inflows accruing to the Acme to Artesia reach. In their report USGS will describe the data and methods used to estimate the base inflows and describe any unusual hydrologic events that occurred during the water year. After review of any objections to the USGS estimates by the states the River Master will make any adjustments deemed necessary to the base inflow estimates and determine the base inflow quantities for the Final Report. If no monthly base inflow quantities are determined and furnished by USGS the River Master will prepare the estimates for the Preliminary Report. (added language is underlined)

Dated: December 26, 1990

/s/ Neil Grigg
Neil S. Grigg
River Master of the Pecos River

Grounds for Modification Determination

Explanation of motion. New Mexico's Amended First Motion would instruct the River Master to make the base inflow determination following "the procedures used in Texas Exhibit 68". Texas Exhibit 68 presented a river routing study to compute the 1947 condition inflow-outflow relationship. New Mexico's First Motion to Modify the River Master's Manual, which was rejected on November 18, 1988, sought the same goal, but with USGS making the computation. New Mexico's goal in both the First Motion and Amended First Motion is to prevent the deduction of Rio Hondo flows from the measured flows at the Artesia gage when base inflow is estimated.

Chronology of the motion. In rejecting New Mexico's First Motion on November 18, 1988, I stated that the States had the following options to resolve the issue: to ask USGS to provide a base flow analysis using the same approach as in Texas Exhibit 68; or New Mexico could develop and move an alternative procedure that the River Master could implement independently of USGS. I wrote that any alternative procedure would have to be: presented in detail, subjected to the review requirements of the Amended Decree, objective, repeatable and based on data that had been collected by existing data collection agencies.

New Mexico furnished a proposed procedure on January 24, 1989 and Texas' reply, including an alternative proposed procedure, was received on February 24, 1989. At a meeting in Albuquerque on March 20-21, 1989 Texas expressed the view that it might be possible to reach agreement about the procedure, and New Mexico and Texas agreed to evaluate each other's suggested procedures and exchanged suggestions for procedures to enable a common basis for comparison. The States agreed to report to the River Master about the outcome of the comparative studies by May 31, 1989 (later extended to September 30).

After the meeting I informed Special Master Monte Pascoe of the discussion and outcome, and Mr. Pascoe agreed to consult the parties to determine how and when to consider questions about the standard for modifying the Manual. Mr. Pascoe's reply to my question was received on November 15, 1990.

On September 30 the evaluations of each state were received. In Texas' response different technical approaches

were evaluated. Texas presented results from three methods as applied to the October 1984 – March 1986 period: Texas' method (criteria 5) – 41.6 TAF; New Mexico's method – 40.8 TAF, and USGS method – 40.8 TAF. Comparable figures for 1985 only were 25.5 TAF; 23.9 TAF and 24.9 TAF. Thus Texas saw results from the three methods as similar, but acknowledged that there would be differences from period to period, and that the concept of stable period may be important to include in the method.

New Mexico's response differed markedly from Texas' response. Calculations by New Mexico for year 1985 were: Texas method (modified by NM) 2.4 TAF; New Mexico method (also called Texas Exhibit 68 method) 32.4 TAF; USGS method 24.9 TAF; and a modified USGS method 30.7 TAF.

To summarize the calculation comparisons (in TAF) for year 1985:

	New Mexico	Texas
Texas method	2.4	25.5
New Mexico method	32.4	23.9
Modified USGS method	30.7	
USGS method (not reevaluated)	24.9	24.9

This shows a disparity in applying either state's method by the other state. New Mexico also entered a number of objections about Texas' proposed method, including a statement that "Any attempt to distribute an unknown amount into base and flood components must be viewed with skepticism (page 11, New Mexico Response). The disparity in results indicate either that a gap exists in each state's understanding of the other's method, or that the subjectivity inherent in the methods prevents repeatability. New Mexico later suggested that the difference was Texas' not following the agreed upon procedures.

It was apparent from this exercise that the states had not worked out differences in computational procedures and that a Manual Modification by written agreement was not forthcoming. The exercise also illustrated that as far as complex hydrograph scalping methods are concerned, standard methods are desirable, but judgement normally will be required to coordinate results from different methods.

In a draft Modification Determination on November 6, 1989 I proposed to reject the Motion and suggested three avenues for further consideration: New Mexico withdraw the Motion and work with Texas to urge USGS to take into consideration the views of the states about the correct procedures; New Mexico continue to develop, in consultation with Texas, more objective and repeatable procedures; or New Mexico propose revised procedures to demonstrate that all contingencies and requirements are taken into account, including objectivity, repeatability, correctness during high runoff periods, and sensitivity to details of Rio Hondo water accounting.

In his reply dated November 27, 1989 Mr. Reynolds stated that New Mexico was willing to allow USGS to exercise professional judgement for the mechanical separation of hydrographs; acknowledged that under some conditions the storage and releases from Two Rivers Reservoir must be considered; opined that the differences in the two states' base inflow procedures were due to Texas not following agreed upon procedures; offered amended language for the motion; and requested a decision on the motion by its first anniversary, December 8, 1989.

Ms. Lynch's reply on December 5, 1989 stated that no agreement by the states seemed imminent, and recommended rejecting New Mexico's motion.

On December 8, 1989 I informed the states of my action to defer decision on the Motion to allow time to await Mr. Pascoe's reply about good cause to modify the Manual. I also raised two questions: 1) is there any result of the litigation as it regards the base inflow estimation that is different than the procedures and methods described in Texas Exhibit 68; and 2) can the states agree on a modification that instructs USGS to use the procedures in Texas Exhibit 68 subject to review by the states and the River Master. I also asked: absent agreement what would be the states' objections to the River Master amending New Mexico's motion along these lines under the provisions of Section III.C.2 of the Amended Decree.

In response to the first question Mr. Reynolds wrote on December 26, 1989 that the answer was no as long as Rio Hondo flows were not deducted. Ms. Lynch replied on January 12, 1990 that the answer was yes, because the Supreme Court had adopted Texas Exhibit 79, not Exhibit 68 and that in adopting the River Master's Manual the Court was calling for different procedures than those in TE 68.

With regard to the second question, Mr. Reynolds wrote that New Mexico had no objections to amending the Motion as long as the Rio Hondo issue was dealt with. Ms. Lynch reported that Texas would object to any amendment that required coherence with TE 68, and proposed that any approval or amendment of the motion should delete any reference to TE 68 and specify instead that USGS rely on their best professional judgement.

On January 19, 1990 Mr. Reynolds wrote proposing language that deleted reference to TE 68. Ms. Lynch responded on January 26 stating encouragement that agreement might be possible and raising questions of interpretation. Mr. Reynolds replied on January 31 with clarification and stated that he was encouraged that there existed the possibility of agreement. Ms. Lynch replied on March 13 proposing that the states jointly ask USGS to establish a gage at the mouth of the Rio Hondo to facilitate an agreement.

On March 29 Mr. White reported that Mr. Reynolds was hospitalized; and Mr. Reynolds subsequently passed away. Mr. John J. Whipple was subsequently appointed Technical Representative for New Mexico.

Mr. White replied on April 18 to Ms. Lynch's letter of March 13 stating potential agreement for installing a gage at the mouth of the Rio Hondo, providing: that a gage is also established on the Rio Hondo below Hagerman Canal, that the USGS adopt a "modified Welder Method", and that the base inflow estimates are made by a qualified person.

Mr. White wrote on June 15 and transmitted a memorandum about the base inflows that had been provided to Mr. Reynolds on December 14, 1989; and on June 18 Mr. Whipple sent a discussion of the points contained in Texas' letter of January 12 1990. On July 17 Texas wrote with a discussion of the propriety of New Mexico's submittals.

Base flow separation. In general, base flow is all flow into a stream other than direct flood flow. A discussion of the base flow concept was presented in the River Master's Modification Determination issued on November 18, 1988.

New Mexico needs assurance that true base inflows are not counted as flood flows and Texas needs assurance that all of the flood flow that was considered in Texas Exhibit 79 is credited under the River Master Manual procedure.

Previous base inflow estimation methods for Acme to Artesia have involved subtracting the Acme hydrograph from the Artesia hydrograh and scalping the remaining hydrograph. If Rio Hondo flows are all flood flows that arrive at the Artesia gage within the same time period as a main river flood, the scalping process would presumably remove them. In that case there would be no need to deduct them. If, on the other hand, they are all base flows, it would be proper to deduct them, if what is sought is the base inflow addition in the Acme-Artesia reach of the mainstem of the Pecos River.

If Rio Hondo flows are mixed flood and base inflows, the situation is more complex and requires special attention, which it has received from USGS. If the Rio Hondo flows are delayed due to reservoir regulation, or if they come in multiple peak or sustained hydrographs, the procedure requires special attention. If Rio Hondo flood flows disappear into the ground and reappear as artesian flows in the Roswell Basin, the picture is even more complex, because the Manual provides no details for accounting for these flows.

Flood flows in Rio Hondo have been a bone of contention in the past. Texas was concerned with storing flood waters of the Rio Hondo; see Pecos River Joint Investigation (PRJI) p 163 which states: "This plan was strenuously objected to by the local interests in Texas, who allege that a large part of the water which would be stored in the old Hondo Reservoir would be lost by seepage into the cavernous

limestones that underlie the reservoir and thereby impair the water supply of the Red Bluff project. The Texas interests proposed that a diversion plan be considered for the project".

There remains a controversy about whether all the flows of the Rio Hondo are flood flows or whether part of them are base flows. This controversy apparently goes back a long time. Rio Hondo flows and others were said by the PRJI to disappear into the artesian aquifer. PRJI states on page 45 ". . . From Salt Creek to Seven Rivers much of the tributary flood flow originating in the mountains on the west sinks underground in passing over the porous strata which form the intake area of the Roswell Artesian basin, or, below this, disappears in the valley fill. . ."

New Mexico and Texas do not agree about whether the Rio Hondo flows are all flood flows. In their September 27, 1988 reply to Texas' opposition to their motions to modify the manual New Mexico stated "The procedure used by USGS . . . has the effect of categorizing the perennial, or low flows, of the Rio Hondo as flood inflow." Texas' technical response, dated October 17, 1988, stated that "The flood flows of the Rio Hondo at the gage below Diamond A Dam near Roswell, New Mexico, are not perennial." This dispute over whether the flow of the Rio Hondo is flood flow or base flow is behind the persistent disagreement over methods.

Methods and data used to estimate base inflow. Texas Exhibit 68 presents a river routing study for the years 1919 through 1946. It ". . . documented the procedures followed by Texas in computing a revised 1947 Condition Inflow-Outflow Relationship. . ." (Texas Exhibit 79, page 1). The Special Master accepted the equation for calculating the

stateline departures presented in TE 68. Texas Exhibit 79 used this equation to compute departures of stateline flows from the 1947 condition in the period 1950-1983.

For base inflow TE 68 uses data from Table A-8-1, Page 8-5 and 8-6 of the 1960 Report on Review of Basic Data (Subcommittee, 1960). This data was prepared by Tipton and Kalmbach, Inc. (T&K), and presented in their "Memorandum on Pecos River Base Flows and Their Relation to Precipitation" dated September 22, 1958 (included in Appendix 8 of the RBD report). TE 79 used the same source of data for the years 1950-56 and then adopted USGS' estimates for the years 1957-1983 which were prepared for the purpose of estimating water salvage due to phreatophyte eradication. USGS used the same basic technique as described in the RBD report until 1978 when they began to try to improve their estimates by considering the details of Rio Hondo water accounting.

According to New Mexico, the Texas Exhibit 68 procedure, stemming from the T&K work, requires scalping the difference hydrograph of the Artesia and Acme daily hydrographs. An alternative to this which is used by USGS is to scalp the Acme and Artesia hydrographs separately, then to take the difference of the resulting base flow graphs.

T&K developed the base flow estimates from actual and synthetic data for the hydrographs at Artesia and Acme. Their data adjustments require nearly three pages of text to describe. There is no evidence that details of watershed accounting such as low flows of the Rio Hondo were considered. I have not found a discussion of either Texas Exhibit 68 or the RBD report about handling of Rio Hondo flows and believe that the T&K analysis did not get down

to the fine level of detail with which USGS now analyzes base inflow additions.

The USGS water budget analysis of the effects of saltcedar removal requires a careful hydrologic budget analysis of the watershed. This is explained in Welder's 1973 and 1988 reports. Since 1978 USGS has deducted the estimated or measured low or sustained flow of the Rio Hondo from the measured flow at the Artesia gage because they apparently believe that these are flood flows, not true base flows. These could be flood flows, for example, if regulation of Two Rivers Reservoir delayed the flows until a release at some time after the flood event. The estimation of base inflows to estimate saltcedar consumption is not necessarily the same computation as an estimation of total base inflows to the Acme to Artesia reach of the Pecos River.

In a [sic] October 30, 1979 letter to S.E. Reynolds and Robert M. Whitenton, Welder stated that "twenty cfs per day was deducted from established base flow to correct for continuous inflow from Rio Hondo." This indicates that for this period, November and December, 1978, the base flow was first calculated without reference to Rio Hondo, then the 20 cfs was subtracted directly.

New Mexico provided references to discussions with USGS employees Welder and McCracken with their first motion to modify the manual (Rodke, 1988). A January 15, 1987 memo relates a discussion with Welder where he described that for seven months in 1978 and 1979 the Rio Hondo flowed for the first time in many years all the way from Roswell to the confluence with the Pecos. This seems to be a different situation than that reported in the PRJI report where it is stated that ". . . from 1890 to 1941 there were at least 47 occurrences of flood flows of sufficient volume

to discharge water to the Pecos River." In a memo dated August 14, 1987 Rodke relates a discussion with Ronny McCracken that describes the procedure USGS follows to make the base flow estimates, but the memo does not explain the use of Rio Hondo flows to serve as a guide to baseflow separation; it suggests that the flows are subtracted directly.

Further reasoning was provided in a December 4, 1987 letter from Robert Knutilla to S.E. Reynolds: "The purpose of the USGS procedure is to compute, with the best information available, values that best represent base inflow to the Acme-Artesia reach and provide that measure against which the effects of phreatophyte eradication and control can be evaluated. It has been the USGS assumption that adjusting the Artesia hydrograph for the estimated discharge from the Rio Hondo directly to the Pecos River is necessary to arrive at an adjusted value representative of actual base inflow to the reach. This assumption is based on information that the Rio Hondo is a losing stream in its lower reaches and that during periods of normal runoff no water is discharged to the Pecos River. No evaluation has been made on the Rio Hondo to determine where it ceases to be a losing stream and what the base-flow component of discharge might be about that point. Adjustments made have been based on miscellaneous measurements and observations of actual discharge to the Pecos River." This statement seems to suggest that USGS believes that all flows in Rio Hondo are flood flows.

USGS' procedures were explained further at the River Master's March 20-21, 1989 Albuquerque meeting and in a September 19, 1989 letter to S.E. Reynolds and V.K. Murthy from Russell K. Livingston of USGS who stated that "The precedent of subtracting inflow from the Rio

Hondo, established by Welder in 1978, was used as a guide to aid in drawing the base-flow separation line during extended high-flow periods that occurred in 1984-1987. For the Artesia site the shape of the base-flow curve at Acme is also considered; observations of diversion by Hagerman Canal from the Rio Hondo were also used at times." Figure 7 of New Mexico's September 29 submittal illustrates the USGS procedure. It is difficult to read the copy of the graph, but USGS apparently subtracts the Rio Hondo flows from the Artesia hydrograph before scalping; that aids in selecting the points of base flow separation. This procedure is clarified in Russell Livingston's letter of September 19, 1989. Why a similar procedure is not necessary for Rio Felix is not explained; but I infer that the difference in treatment results from the lack of storage on Rio Felix and the greater complexity of Rio Hondo.

Initially there seemed to be confusion about whether USGS simply deducted the Rio Hondo flows, but now it is apparent that they deduct the flows to aid in judging how to scalp the Artesia hydrograph. For practical purposes this has essentially the same result as a direct deduction of the flows.

Summary of reasons for determination. In rejecting the First Motion I agreed that procedures used in the River Master's Manual for determination of the annual delivery obligation should be consistent with those that were used to develop the mathematical relationship with which the determination of annual delivery obligation is made. I clarified this statement in a letter dated December 8, 1989: ". . . the Manual should be consistent with the results of litigation that fixed computational procedures to determine the annual delivery obligation." The total result

of the litigation as it is embodied in the River Master's Manual (Texas Exhibit 108) is the guide for consistency.

New Mexico has demonstrated that USGS has changed their estimation techniques and statements by USGS seem to indicate that they will continue to modify these methods in attempts to improve estimates of base inflow.

The Modification is intended to make the Manual more consistent by removing ambiguity about the criteria USGS uses to estimate flood inflow. The criteria implicit in the draft modification determination is ". . . the best available data and methods to estimate the total monthly base inflows accruing to the Acme to Artesia reach." Because each state, USGS and the River Master may have different evaluations of the best data and methods, as well as about the results of an annual calculation, the Modification provides for the states and the River Master to review USGS' estimates and for the River Master to make the final determination using the authority granted by the Amended Decree.

The states have worked hard to resolve this Motion and disputed issue. Questions about the procedure to estimate the base inflow quantities can continue to be pursued directly with USGS, through the Pecos River Commission or through the Office of the River Master, depending on the desires of the states. This can include dealing with issues such as whether gage(s) will be placed on the Rio Hondo.

In summary, this modification determination: removes any reference to Texas Exhibit 68; relies on USGS to make the annual estimation; provides the states with annual opportunities to review USGS results and methods; provides for consideration of unusual events; enables the River Master

to review USGS results and methods in the context of the states' objections and to make the initial estimate if USGS results are not furnished; and leaves the states with an opportunity to seek relief through the provisions of the Amended Decree. The states may also cooperate to conduct additional research into base inflow estimation and provide USGS with guidance for making the annual estimates.

References

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Texas' River Routing Study and Recomputation of 1947 Condition Inflow-Outflow Relationship (Texas Exhibit 68), November 1983.

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PECOS RIVER COMPACT

Modification Determination
New Mexico's Third Motion and Texas' Cross Motion
to Modify the River Master's Manual

December 7, 1992

Neil S. Grigg
River Master of the Pecos River
1009 Lemay, # 103
Ft Collins, Colorado 80524

No. 65, Original

IN THE
SUPREME COURT OF THE UNITED STATES
OCTOBER TERM, 1992

STATE OF TEXAS, Plaintiff,

v.

STATE OF NEW MEXICO, Defendant.

Office of the River Master: Neil S. Grigg

MODIFICATION DETERMINATION

NEW MEXICO'S THIRD MOTION TO MODIFY THE RIVER MASTER'S MANUAL

New Mexico's Third Motion to Modify the River Master's Manual, dated April 18, 1990, proposes to replace Section B.4 with new language. This Modification Determination amends New Mexico's Third Motion and also is a Final Determination on Texas' Cross Motion. The Draft Modification Determinations (DMDs) dated July 6, 1992 and November 2, 1992 present background for the determination and a list of references. They are adopted by reference as part of this Modification Determination. The Motion is amended by replacing Section B.4 of the River Master's Manual with the text of the amended motion given on pages MD-2 through MD-5 following.

/s/ Neil Grigg
Neil S. Grigg
River Master of Pecos River

CERTIFICATE OF SERVICE

I certify that on December 7, 1992 I served the Modification Determination for New Mexico's Third Motion to Modify the River Master's Manual on Paul Elliott and Peter Thomas White, Legal Representatives for the States of Texas and New Mexico.

/s/ Neil Grigg
Neil S. Grigg
River Master of Pecos River

B.4. Determination of Flood Inflows, Artesia to Carlsbad

The flood Inflows for the Artesia to Carlsbad reach are computed as the sum of the flood inflows to the Artesia to Dam Site #3 reach and the flood Inflows to the Dam Site #3 to Carlsbad reach. Monthly quantities for each item will be measured or computed, and the annual quantities will be the sum of the monthly quantities. The computational items used to estimate the flood inflows for this 45.3 river mile reach of the Pecos River are listed below, followed by an explanation of each computation to be made:

Flood Inflow, Artesia to Dam Site #3
Flood Inflow, Dam Site #3 to Carlsbad
Total inflow to the Dam Site #3 to Carlsbad Reach
    Streamflow, Pecos River at Dam Site #3
    Carlsbad Springs New Water
Total outflow from the Dam Site #3 to Carlsbad Reach
    Lake Avalon Evaporation Loss
    Lake Avalon Change in Storage
    Net Carlsbad Irrigation District Diversions
    Other Depletions
    Streamflow, Pecos River at Carlsbad
Flood Inflow, Artesia to Carlsbad

a. Flood Inflow, Artesia to Dam Site #3

Use the sum of the monthly flood flow quantities determined by hydrograph scalping of the daily USGS streamflow records for:

(1) Rio Penasco at Dayton, NM;

(2) Fourmile Draw near Lakewood, NM;

(3) South Seven Rivers near Lakewood, NM;

(4) Rocky Arroyo at Highway Bridge near Carlsbad, NM.

b. Flood Inflow, Dam Site #3 to Carlsbad

Compute the total inflow to the reach (item B.4.c.) and the total outflow from the reach (item B.4.d.). Subtract the total inflow from the reach (item c) from the total outflow (item d).

c. Total inflow to the Dam Site #3 to Carlsbad Reach

Total inflow to the Dam Site #3 to Carlsbad Reach is computed as the sum of items (1) and (2) below:

(1) Use USGS streamflow records for the Pecos River at Dam Site 3, near Carlsbad, N.M.

(2) Carlsbad Springs New Water

Use the following procedure to compute the monthly new water discharge quantities rounded to the nearest 100 acre-feet.

(a) Use the annual streamflow records (expressed in cfs) furnished by the USGS for the gaging station, Pecos River below Dark Canyon, at Carlsbad, N.M.

(b) Subtract tributary inflow from Dark Canyon Draw, furnished by USGS for the Dark Canyon Draw at Carlsbad gaging station.

(c) Subtract releases and spills from Lake Avalon which are furnished by USGS for gaging station, Pecos River below Avalon Dam, N.M.

(d) Add 2 cfs for the annual depletions from the Pecos River from the Carlsbad canal flume to the Carlsbad gage.

These depletions are caused by the power plant consumptive use, evaporation from Tansill and Bataan Lakes, and all diversions including the Carlsbad golf course, F.V. Dowling and E.J. Hines.

(e) Subtract the lagged seepage from the main CID canal in cfs which is computed to be 7 percent of the CID diversions measured at Avalon Dam by USGS for gaging station, Carlsbad Main Canal at Head, Carlsbad, N.M. This seepage will have a lagged distribution as follows: one-half in the current quarter; one-third in the following quarter; and one-sixth in the next quarter.

(f) Subtract one cfs to represent the average annual return flow from surface water irrigation between Avalon Dam and the gaging station Pecos River at Carlsbad.

(g) Subtract lagged leakage from Lake Avalon. The leakage from Lake Avalon is estimated by using the mean monthly gage height (H) in feet for Lake Avalon (published by USGS for Lake Avalon Near Carlsbad, N.M.), in the equation: Avalon leakage in cfs = 4.78 (H) - 62.0. One half of this leakage is assumed to appear at Carlsbad Springs during the current quarter; with one-third to appear during the following quarter; and one-sixth during the next quarter.

(h) Subtract 3 cfs to represent the average seepage loss from the Pecos River in the reach between Major Johnson Springs and the Dam site No. 3 gage.

(i) The annual new water in cfs is: (a) - (b) - (c) + (d) - (e) - (f) - (g) - (h).

(j) Convert the new water in cfs, item (i) above, to units of 1000 acre-feet, and distribute equally to each month of the year.

d. Total outflow from the Dam Site #3 to Carlsbad Reach

Total outflow from the Dam Site #3 to Carlsbad Reach is computed as the sum of items (1) through (5) below:

(1) Lake Avalon Evaporation Loss

(a) Compute the monthly evaporation loss by multiplying the monthly net evaporation rate times the average monthly surface area for Lake Avalon.

(b) Use the USGS elevation, area and capacity relationship for Lake Avalon to estimate the average monthly surface area for the lake. The 1982 area-capacity table based on the 1979 United States Bureau of Reclamation (USBR) sediment survey for Lake Avalon (Table 3) is to be used until a revised area-capacity table based on a new sediment survey performed by the USBR, the U.S. Army Corps of Engineers, USGS, U.S. Soil Conservation Service or a state-registered engineer is available.

(c) For Lake Avalon evaporation and precipitation, use U.S. National Weather Service (USNWS) evaporation and precipitation data for Brantley Dam. When the U.S. National Weather Service data are not available, use USBR evaporation or precipitation data for Brantley Dam. If neither USNWS nor USBR precipitation data are available, use precipitation data from Carlsbad or Carlsbad Federal Aviation Administration Airport in that order.

(d) Missing monthly evaporation data at Brantley Reservoir are to be computed using the following equation:

$$E_L = 2.5*[(p*T/100)*(114-H)/100] - 1.5$$

where E_L is the lake evaporation in inches, p is the percentage of daytime hours at the approximate location of Avalon Reservoir, as given in the table below; T is the

mean monthly temperature in degrees F, average of Artesia and Carlsbad; H is the average percent humidity for the month computed from the data at 5AM, 11AM, 5PM and 11PM furnished by the National Weather Service.

Table of Percentage of Daytime Hours for Avalon Reservoir

January	7.17	July	9.80
February	6.95	August	9.29
March	8.36	September	8.34
April	8.76	October	7.92
May	9.65	November	7.08
June	9.62	December	7.02

If Brantley Reservoir evaporation data are not available, and humidity data at Roswell and other data are not available for estimating evaporation at Lake Avalon, and there is not more than one month missing between months for which data are available, estimate the evaporation by interpolation between monthly data. If complete evaporation data are missing for more than one month and data for all the above described methods are not available, find the average daily evaporation that is published for that month and estimate total evaporation by multiplying the average daily evaporation times the number of days in the month.

(e) Monthly net evaporation in feet for Lake Avalon is determined by multiplying pan evaporation in inches by 0.77 to determine monthly lake surface evaporation, subtracting the monthly precipitation in inches, then converting to feet by dividing by 12.

(2) Lake Avalon Change in Storage

Use data from USGS gage height records for Lake Avalon near Carlsbad, N.M., and gage height-area-capacity relationships shown in Table 3.

(3) Net Carlsbad Irrigation District Diversions

Use 93 percent of the USGS published records for the gaging station, Carlsbad Main Canal at Head, Near Carlsbad, N.M.

(4) Other Depletions

For other depletions referenced in B.4.c.(1)(d) add 100 acre-feet for all months except July and August and 200 acre-feet for July and August.

(5) Streamflow, Pecos River at Carlsbad

Use the USGS gaging station records for Pecos River below Dark Canyon, at Carlsbad, N.M., minus the gaged streamflow at the USGS gaging station, Dark Canyon Draw at Carlsbad, N.M.

In 1970, the USGS discontinued the gaging station Pecos River at Carlsbad, N.M., and moved it to a new site about 0.8 mile downstream. The new "Carlsbad gage" was renamed Pecos River below Dark Canyon Draw and it now measures tributary inflow from Dark Canyon Draw that was not previously measured at the Carlsbad site. The total flow of Dark Canyon must be subtracted from the total flow Pecos River below Dark Canyon Draw in order to arrive at the equivalent total flow at the old location at Carlsbad.

(e) Flood Inflow, Artesia to Carlsbad

Add items (a) and (b) above.

Modification Determination
New Mexico's Third Motion and Texas' Cross Motion to Modify the Manual

GROUNDS FOR DETERMINATION

December 7, 1992

Summary

New Mexico's Third Motion was filed on April 18, 1990. The last Draft Modification Determination proposed to adopt the tributary method, and both states have agreed with this proposal. Texas has agreed to defer consideration of the salvage water and shortfall routing issues to the future. New Mexico objected to the proposal to extend a net credit of 2.5 TAF to Texas, and this Final Determination adopts New Mexico's recommendation to remove the credit. Although Texas does not receive the credit, both states should benefit from this action because the causes of potential disputes have been removed, including a numerical error in the 1988 Final Report.

General Background

The background for the Motion was described in the Draft Modification Determinations (DMDs) dated July 6, 1992 and November 2, 1992, which are adopted by reference as part of this Modification Determination (MD). The states responded to the November 2, 1992 DMD on November 20, 1992.

The November 2, 1992 Draft Modification Determination

The DMD dated November 2, 1992 proposed to adopt the tributary method. Computations were to be referenced

back to water year 1990, with the exception of proposed bank storage credits for water years 1988 and 1989 when I withheld the B.4.i.(2) bank storage credit. Considering this credit and others, final resolution of credits in the Third Motion was proposed to be a flood inflow credit to Texas of 2.5 TAF, to be credited in Accounting Year 1993. Texas' concern about accuracy of tributary gages had been addressed through a response from USGS. All issues raised by the states had been considered and discussed, although issues remained where the states might choose to negotiate among themselves.

Texas' Response to the November 2, 1992 DMD

Texas made the following points in their response dated November 20, 1992:

Texas agreed to accept the conceptual approach of the DMD with two conditions: that the accuracy of the gages used in accounting be examined and verified, and that they reserve the right to file future motions to correct any problems identified with the procedure. The first condition was satisfied by USGS' response, and the second refers to future years.

Texas agreed to defer consideration of the salvage water issue and shortfall routing to the future. On shortfall routing, Texas clarified their position on issues discussed in the DMD having to do with New Mexico's obligation to deliver at the state line.

Texas furnished text for the method to estimate missing evaporation. Texas' suggested text has for the most part been adopted. New Mexico also suggested that the method for estimating missing evaporation data be retained.

New Mexico's Response to the November 2, 1992 DMD

New Mexico agreed with the adoption of the tributary method, which they proposed in the first place.

New Mexico made two suggestions for clarification to the Modification Determination, and they have been accepted.

New Mexico suggested that the current text for estimating missing evaporation data be included in the Manual. Texas made a similar suggestion, and Texas' suggested text has for the most part been adopted. The use of the 5 p.m. humidity record, along with 5 a.m., 11 a.m. and 11 p.m., has been adopted because omitting it appears to have been a clerical error in the Manual.

New Mexico suggests that if data are missing, the procedure can be used by New Mexico when furnishing evaporation data to the River Master. I encourage New Mexico to do this whenever data are missing. This will save time during the annual accounting.

On page 2, New Mexico suggested that the last paragraph in Section B.4.e of the DMD be either revised or deleted. I have accepted the suggestion to delete it, as explained later. New Mexico then presented detailed reasons and positions on the different aspects of flood inflow credits that were considered in the Third Motion process. These credit items and New Mexico's positions are discussed in the next section.

New Mexico's Response concludes with recommendations on pages 38 and 39. These recommendations deal with the issue of credits, discussed in the next section. These credits include the arithmetic errors which were reported to me during the Third Motion process.

New Mexico also recommends that the flood inflows for water years 1990 and 1991 be recomputed to enable accurate accounting for water year 1992, considering the averaging process. This recommendation follows logically from the Third Motion determination, and will be implemented during Accounting Year 1993.

As discussed in the next section, my decision on credits is to adopt New Mexico's suggestion to remove them.

Reanalysis of Credits

In the Grounds to the November 2, 1992 DMD, I considered and discussed the following claims for credits:

1. The B.4.i.(2) credit for BBS. I proposed to credit Texas with 9.7 TAF in FIF for the BBS that accumulated during 1988 and 1989.

2. Credit to New Mexico for a numerical error in the 1988 Annual Report. The states did not agree about this credit, and I removed it from the November DMD proposal with the expectation that the states might negotiate about it and use it as a context to establish guidelines for any future clerical errors.

3. Potential credit to New Mexico for the issue of year-to-year fluctuations in channel losses. This issue related to water years that occurred prior to the filling of Brantley Reservoir. The fluctuations occurred due to the channel loss equation in the Manual procedure, which is considered as a Court-approved procedure for the years in question.

4. Credit to New Mexico for Water Years 1990 and 1991, following the principle that adjustments go back to Water

Year 1990. I proposed a credit of 7.2 TAF to New Mexico after recomputing Water Years 1990 and 1991.

New Mexico raised an additional claim for credit because USGS deducted Rio Hondo flood flows during water years 1987-1990 (page 20-21). This issue refers to New Mexico's Amended First Motion which was decided in December 1990, and is outside the realm of the Third Motion process.

In the November DMD, the proposed credits were 9.7 TAF to Texas for B.4.i.(2), and 7.2 TAF to New Mexico for the adjustment for 1990-91, making a net credit to Texas of 2.5 TAF.

New Mexico's (November 20, 1992) arguments against the provision of a bank storage credit to Texas are (summarized from page i):

1. The credit is technically invalid because an improper water balance was used and unverified assumptions were used.

2. The credit is legally erroneous because it is an unauthorized retroactive adjustment.

3. The credit is inequitable because it corrects some shortcomings without correcting others.

4. The River Master has the obligation and authority to correct arithmetic mistakes.

After reviewing these arguments, parts of which had been raised earlier and were discussed in the November 2, 1992 DMD, my conclusions are as follows:

1. The allegation of an invalid water balance was discussed on page GR-3 of the DMD and at the September meeting. The RMM states in B.4.b.(3) to use 8200 acre-feet

for Major Johnson Springs New Water. The RMM does not distinguish between recharge and discharge. The difference between these items is recognized in the November 2, 1992 DMD, and can be seen from the diagrams and equations in the July 6, 1992 DMD. I rejected New Mexico's suggestion that the flood inflow for 1988 and 1989 be recomputed using the Third Motion procedure. The difference between the two procedures was very small anyway.

2. The legal aspects of retroactive adjustments are outside my sphere of authority. On the basis of the Third Motion procedure, I have tried to be consistent in stating that the Brantley Bank Storage water budget item would be credited as soon as the procedures were available, and I do not consider this to be a retroactive adjustment of a Final Determination; rather I consider it a logical way to handle a procedural problem that was recognized at the time Brantley was filled. I anticipated that a fair solution would be worked out during the Third Motion process.

3. I considered issues of equity in the November 2, 1992 DMD, and my response about credits reflected my conclusions about the equity of the different claims for credits. My decision was not to consider New Mexico's claim for adjustments due to the year-to-year fluctuation issue for water years 1987-89 because final determinations for those years were based on official procedures in the RMM at that time. The issue of credits due to USGS' technique for analyzing Rio Hondo has not been considered in the Third Motion because that issue was considered in the Amended First Motion which was decided in December 1990. The other equity issue raised by New Mexico, the arithmetic error, is covered next.

4. New Mexico argued that I have the obligation and authority to correct the 4.7 TAF arithmetic mistake contained in the 1988 Final Report. New Mexico describes the origin of this error correctly on pages 32 and 33. Because this was the first accounting year under the Amended Decree, and the computer procedures were new, the states had no opportunity to detect the arithmetic error because the spreadsheet setup was revised after the Preliminary Report had been reviewed. After learning of this error, I stated an intention to have it corrected. In the DMD dated July 6, 1992, I stated (page GR-7): "During the Third Motion process it also became clear that additional adjustments might be needed in the interests of equity. These are a 4.7 TAF adjustment for an AY 1988 accounting error that was identified in the Third Motion process and an adjustment of 7.2 TAF to compensate for the two years of interim procedures for computing MJS. . . . By this action I am definitely not seeking to open the way to adjustments to Final Reports after the determination has been made."

After the states responded to the July 6 DMD, I removed the proposed credit in the November 2, 1992 DMD with the statement (page GR-6): "Credit to New Mexico for a 4.7 TAF spreadsheet error in FIF that was in the 1988 Annual Report is not provided. The states did not agree about that credit at the September meeting, but left open the possibility that they could negotiate it at any time in the future, and they could then inform the River Master and credit would be provided."

After reviewing New Mexico's final comments on the November 2, 1992 DMD, I agree that the arithmetic error should be corrected. I see no reason to leave the error in

place, for the reasons that I will state in the following paragraphs.

My final determination about credits is based on several principles and conclusions resulting from the Third Motion process.

First, I do not seek to initiate a precedent for making retroactive adjustments to final determinations. The states can, however, agree on any matter, and I am bound to accept it. This is the logical avenue for any adjustments to delivery obligation. Thus, by not providing any statement of credit to one state or the other, the issue of retroactive adjustments is removed from the Modification Determination.

However, in considering the adjustments that are needed as a result of the Third Motion process, I have weighed the equity of the claims for credit that are summarized above, and my decision to remove the proposed credit from the MD is based on my conclusion that after weighing these claims, they balance each other out within the bounds of accuracy of estimating the water budget items.

The credits referred to begin with the credit to New Mexico for the computations for Water Years 1990 and 1991. Based on the principle that accounting is referred back to water year 1990, I believe that it is fair to extend the 7.2 TAF credit to New Mexico. The method for using existing Manual procedures to estimate MJS for those years was thoroughly explored, and found to be infeasible. This is documented in the Final Reports for those years and in the Third Motion documents.

Based on my consistently stated intention to provide the 1988-89 bank storage credit to Texas, I believe that it is fair to extend the bank storage credit. However, after

noting New Mexico's extensive technical arguments about the validity of the water balance and assumptions about aquifer characteristics, I agree that we cannot know with precision the exact amount of bank storage. While we cannot know the exact amount, Texas is clearly entitled to some bank storage. It has been my impression from the use of a minimal value for storage coefficient that the bank storage quantities proposed were probably on the low side of the true values. In any event, we know enough about the quantity to know that it is significant, and I believe that we can estimate its magnitude closely enough to recognize the credit.

Finally, I believe it is equitable to correct the arithmetic error. My position in the November 2, 1992 DMD was not intended to withhold the credit from New Mexico, but to remove the issue from the Third Motion process. There is a difference between this kind of error, which is easily identified and corrected, and alleged errors which involve disputes between the states and technical questions without clear answers. I consider this arithmetic error to have been a one-time occurrence, it clearly occurred, and if it had been brought to my attention earlier, I would have sought an avenue to correct it, probably through agreement of the states. I hope that no further errors of this kind occur, but if they do, I will seek to work with the states to correct them in an equitable manner.

The credits balance out essentially to zero. This is because the 7.2 TAF for New Mexico and the 9.2 TAF for Texas net to 2.5 TAF for Texas, and when the 4.7 TAF for New Mexico is added back in, the net swings to 2.2 TAF of flood inflow for New Mexico. This small quantity is equivalent to about 1.5 TAF of delivery obligation, or less than 0.5%

of the 378.8 TAF total delivery obligation for the years in question, 1988-1991.

Whereas my November 2 proposal was to include the credit statement in the MD, I have now accepted New Mexico's suggestion and removed it.

By netting these credits out, including the arithmetic error, and adopting New Mexico's suggestion to delete the proposed 2.5 TAF credit to Texas, three things are accomplished. First, the technical disputes about aquifer characteristics and water balances are bypassed. Second, the issue of retroactive credits is bypassed because none are provided in the MD. Finally, New Mexico's claim to correct the arithmetic error has been addressed, and there should be no reason for further dispute about the arithmetic error.

It is fortuitous that the credits balance out about to zero and that the issue of retroactive credits can be bypassed. While I have taken advantage of this situation to remove the credit and bypass the retroactive adjustment issue for the time being, I have weighed the equity of the claims for credits and considered them in the Final Determination. I believe that this weighing of credits during a motion process is necessary to deal with the issue of consistency, and it may recur in the future. If it does, the states can consider for each such case how any potential credit issue should be handled.

This is a Final Determination about Texas' claim for a B.4.i.(2) credit for BBS, New Mexico's claim for credit for a spreadsheet error in the 1988 Annual Report, and New Mexico's claim for credit to adjust for Water Years 1990 and 1991. Although by this action Texas does not receive the 2.5 TAF bank storage credit, I believe that both Texas

and New Mexico benefit from this action by the removal of causes for future disputes over retroactive adjustments.

REFERENCES

References from April 18, 1990 to July 6, 1992 are listed in the July 6, 1992 DMD. References from July 7, 1992 through November 1, 1992 are listed in the November 2, 1992 DMD. Additional references are:

River Master, Draft Modification Determination, New Mexico's Third Motion and Texas' Cross Motion to Modify the River Master's Manual, November 2, 1992.

New Mexico, Comments in Response to Texas' October 28, 1992 Letter Regarding Brantley Reservoir Bank Storage, November 2, 1992.

New Mexico, New Mexico's Comments on the Fourth Draft Modification Determination on the Third Motion, November 20, 1992.

New Mexico, New Mexico's Reply to Texas' Response to the Third Draft Modification Determination on New Mexico's Third Motion, November 20, 1992.

Texas, Texas' Response to the River Master's November 22, 1992 Draft Modification Determination on New Mexico's Third Motion and Texas' Cross Motion to Modify the River Master's Manual, November 20, 1992.

NO. 65 ORIGINAL

IN THE
SUPREME COURT OF THE UNITED STATES
OCTOBER TERM, 1987

STATE OF TEXAS

Plaintiff,

v.

STATE OF NEW MEXICO,

Defendant,

THE UNITED STATES OF AMERICA,

Intervenor.

CHARLES J. MEYERS, SPECIAL MASTER
REPORT
November ___, 1987

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I

INTRODUCTION

In July, 1986, I filed a Report in this case proposing findings, conclusions and a decree that would bring an end to this litigation, at least for the time being. But I also expressed concern that the case would be back in court before long, for two reasons: (1) New Mexico would have difficulty in repaying, in water, the 340,100 acre feet I found she owed Texas, and (2) disputes over future deliveries would wind up in litigation, since the Pecos River Commission could not be expected to be any more effective in the future than it had been in the past. To solve these problems, I suggested that the Court might wish to consider a judgment for money damages to remedy past shortfalls and the appointment of a River Master to administer the decree in the future. Both suggestions were adopted, and the case was remanded to me to consider the question of remedy and "to recommend an amendment to the decree, specifying . . . the duties of the River Master and the consequences of his determinations. Any other suggestions for amendments should also be called to our attention." 107 S.Ct. 2279, 2287 (1987). I have set the remedies question for trial in February of 1988. By agreement, the parties have included in the issues to be tried the shortfall, if any, for the period 1984 through 1986. Those three years will be tacked on to the administrative period of 1950 through 1983, which was the subject of this Court's decision on June 8, 1987.

This Report addresses the regime that will govern the river from 1987 forward. More particularly, it recommends an Amended Decree which, in addition to enjoining New Mexico to comply with her Article III(a) obligation, provides for the appointment of a River Master, sets forth the

River Master's duties and powers and the consequences of the River Master's determinations, and incorporates the Pecos River Master's Manual to guide the River Master in performing his or her duties. Before turning to specific points in the proposed Amended Decree and the Manual, I draw to the Court's attention the desirability of appointing a River Master and entering a decree this Term of Court, despite the press of other business. Water year 1987 will be the first year at which the new regime applies. Under the proposed Amended Decree, the River Master will make his determinations for water year 1987 in 1988, and New Mexico must satisfy any shortfall for 1987 by March 31, 1989. Adherence to this schedule will best be accomplished by having a River Master in place as early as possible in 1988. This suggests a hearing on exceptions to this Report this Term, if at all possible. The proposed Amended Decree presumes that it will take effect in 1988.

II

THE PROPOSED AMENDED DECREE

It is my recommendation that the proposed Amended Decree replace the June 8, 1987 Decree set forth in 107 S. Ct. at 2287, so that a complete charter for the enforcement of the Court's judgment is available in one place for the River Master. The proposed Amended Decree includes, of course, the substance of the Court's June 8, 1987 Decree.

Several components of the proposed Amended Decree deserve brief comment. Since the data required for the calculation of New Mexico's delivery obligation for a given year are not available until the year following, the

Amended Decree directs the River Master to make determinations for a particular "water year" in the following year, termed the "accounting year." If, in the accounting year, New Mexico is found to have fallen short of her delivery obligation, the Amended Decree allows her through March of the year following the accounting year to make up the deficiency. New Mexico objects to this provision and proposes instead that she be allowed to accumulate credits and shortfalls year to year and be deemed in default only when total accrued shortfalls exceed thirty percent of her delivery obligation for any five-year period, and then only to that extent. She offers several arguments in support of this proposal.

First, New Mexico takes the position that, since the flow of the Pecos is highly variable, she may be asked to bear heavy delivery burdens at large economic cost. She argues that such costs would be unnecessary if the delivery obligation was smoothed out over a longer period than the yearly delivery requirement contemplated in the proposed Amended Decree. I am not persuaded. While it is desirable to avoid unduly heavy delivery requirements, a 30% rule measured over a five-year accounting period creates unacceptable risk, in my view. The probabilities are very high that New Mexico would fall farther and farther behind in her III(a) obligation over time. A review of Table 2 in Texas Exhibit 79 (p. 5) shows mounting deficits over time despite intermittent positive departures. Under her proposal, it seems very likely that early in the administration of the decree – indeed, quite possibly at the end of the first five years – New Mexico would be in debt for 30% of other accumulated Article III(a) obligation. On the average, for the period 1950-1983, she was in default by 10,000 acre feet per year. So long as the principle

survives that New Mexico owes water to Texas under the Compact, the only sure, or even probable, way of honoring that principle is to make the delivery obligation an annual one. The Court has clearly indicated that the remedy of money damages, if appropriate at all, is an extraordinary, one-time solution to an exceedingly difficult remedial problem and that future performance is to be in kind. 107 S. Ct. at 2285-86.

Second, New Mexico argues that the Court recognized in its June 1987 opinion that it was impracticable to expect New Mexico to satisfy shortfalls on an annual basis. As evidence thereof, New Mexico cites language in the opinion to the effect that "shortfalls or credits will be reflected in [New Mexico's] later delivery obligations." 107 S. Ct. at 2287. New Mexico urges that her proposal for accumulation of credits and shortfalls is consistent with this language. I do not read the language as intending to suggest that New Mexico should not be required to keep herself current. Such a reading is completely at odds with the Court's view that in the future, Texas should receive its water. The Court had before it a clear example of the pitfalls of accumulation – a debt so large that payment in water could be exceedingly difficult.

Finally, New Mexico argues that even if she holds man's activities to the 1947 level, there will still be negative departures from the 1947 condition that are properly attributable only to "the vagaries in the flow of the Pecos River." As support for this proposition, New Mexico cites the fact that the 1947 condition curve itself, Figure 1 of Texas Exhibit 68 (p. 3), represents a number of scattered points, none falling exactly on the curve and all reflecting man-made uses at the permissible 1947 level. In the

future, the argument goes, we can expect similar departures from the curve without changes in man's activities. To be sure, the curve is not an exact representation of the scattered points it seeks to define. But it is the law of the case. Nearly four years ago, my predecessor concluded that "the curve of relationship shown by Texas Figure 1 on p. 3 of Texas Exhibit 68 and the accompanying Table 1 on p. 4 correctly quantify the obligation of New Mexico to Texas as the same is stated in Compact Article III(a), as implemented by the Master's decision of August 13, 1979, and approved by the Supreme Court in its decision reported at 446 U.S. 540." Report and Recommendation, filed 2/27/84, at p. 13. This conclusion was approved by the Court. 467 U.S. 1238 (1984). Even if the point was not settled, I see no other way to administer this Compact. The 1947 condition, as defined in these proceedings, has to be translated into a water quantity to provide a numerical standard for measurement of compliance, and this necessarily involves a margin of error. I might add that the margin of error here is not one-sided: Texas suffers equally when the curve errs on the side of understating the Article III(a) obligation. Tr. pp. 44-46, 61 (10/15/87).

The proposed Amended Decree affords New Mexico maximum flexibility in determining how to satisfy any shortfall. The state is given the opportunity, with respect to each year of shortfall, to submit a plan as to how she will remedy the shortfall. The plan must identify the source of the make-up water and specify a delivery schedule so that satisfaction of the shortfall can be verified, but New Mexico is given the freedom to determine the sources of the make-up water and (within certain limits) the timing of its delivery. Moreover, those determinations may change from year to year as circumstances vary. New Mexico is

not seriously constrained by Article IX of the Compact, which requires application of "the principle of prior appropriation within New Mexico": with or without this provision she would have been compelled to honor intrastate priorities in providing the water to satisfy Article III(a). But she remains free to buy, lease or otherwise obtain the necessary water, so long as priorities are not disturbed.

The Amended Decree anticipates that satisfaction of any shortfall will be determined by means of the procedures and equations set forth in the Manual. In other words, a calculation will be performed using the Manual to determine the amount of water that can be presumed to arrive at State line as a result of the specific actions proposed by New Mexico. If that amount equals the amount of the shortfall, New Mexico's actions will be deemed to satisfy the shortfall. Given the fungibility of water, this was thought to be the best way of ensuring that State line flows are actually increased by the amount of a shortfall, while still allowing New Mexico to engage in private ordering to satisfy the shortfall. Any arrangement which contemplates simply gauging the flow at State line to verify delivery of make-up water is unworkable. No physical means of distinguishing make-up water from III(a) obligation water exists: calculations alone can make the distinction.

The River Master's duties are set out in some detail on the Amended Decree. Unless and until a change is proposed in the Manual, the River Master's function is largely ministerial, although some judgment may be required from time to time in the selection of numerical values. The need for sound judgment will arise when one party seeks to modify the Manual without the concurrence of the other party. The Amended Decree does not empower

the River Master to initiate changes in the Manual. It was thought to be more cost effective to leave the initiative to the parties, since their experts will have to evaluate a proposed change in any event. Moreover, there is no need to incur the risk of a bureaucratic build-up in the name of research in the office of the River Master. On the other hand, the River Master is correctly delegated the power to decide in the first instance the propriety of proposed but contested changes in the Manual. For the most part, these proposed changes are likely to raise technical issues of hydrology or statistics, as to which the River Master will have expertise. Because of that expertise, the recommended standard of review is whether the River Master's findings or conclusions are clearly erroneous. Of course, a change agreed to by both parties, whether proposed through the Pecos River Commission or directly to the River Master, is binding.

Finally, the Amended Decree recommends the dismissal of the United States from this action without prejudice. At the request of the Solicitor General, the United States was excused from participation in the proceedings at an early stage. I informed the Solicitor General of my intention to recommend dismissal and he interposed no objection in his written reply.

III

THE PECOS RIVER MASTER'S MANUAL

The parties have agreed on all of the provisions in the Manual except one – the provision dealing with the accounting for depletions caused by McMillan Dike. In addition, New Mexico objects to the absence from the Manual of provisions which she contends would have

required a separate determination of the depletions resulting from man's activities in New Mexico. At a hearing on October 15, 1987, evidence was presented on these two issues and, following the hearing, post-hearing briefs were submitted. Based on the evidence and argument, I find that New Mexico should not be charged for the salvage accomplished by the Dike in the past which will be continued in the future upon the completion of Brantley Reservoir. I have also concluded that removal of references in the Manual to man's activities was entirely appropriate. Submitted with this Report is Texas Exhibit 108, which incorporates the agreements of the parties and my findings with respect to the disputed issues.

A. Brantley Reservoir and McMillan Training Dike.

As set forth in my July 1986 Report, the McMillan Training Dike was constructed in 1954 for the purpose of reducing leakage from McMillan Reservoir and was successful in doing so. The Report recommended that New Mexico not be charged for the salvage accomplished by the Dike, and the Court accepted that recommendation. July 1986 Report, pp. 11-22, 31. Brantley Reservoir will replace McMillan Reservoir and is expected to be completed in 1988. When that occurs, McMillan Dam will be breached and the Dike will no longer serve any function except in cases of extreme flood. Tr. 40-42 (10/15/87).

Texas argues that since water will no longer be salvaged by the Dike once McMillan Dam is breached, the Manual should provide for the elimination of the credit to New Mexico at that time. I think this argument misapprehends the basis for the credit. The flood in the winter of 1941-42 washed away natural sealing materials in

McMillan Reservoir and left caverns and crevices in its east side, through which large quantities of water escaped. The 1947 condition reflected those losses. When the Dike was completed in 1954, the losses were reduced, but the inflow-outflow equations then in effect did not take account of this change in the 1947 condition. When the Pecos River Commission agreed in 1961 to credit the salvage, it authorized a change in the 1947 condition. That change was quantified by the Commission itself for the period 1950-1961, when it agreed that the savings were 48,000 acre feet. For the period 1962-1983, there was no agreement by the Commission on the quantity in acre feet that was salvaged, but Texas herself, through the testimony of an expert, Dr. V.R. Krishna Murthy, established an equation for calculating the savings for the later period. Dr. Murthy's calculation showed savings of 27,600 acre feet, which I proposed be credited to New Mexico. July 1986 Report, pp. 21-22. The Court adopted the recommendation. Thus, Dr. Murthy's equation became part of the Manual, and I have concluded that it should remain a part of the Manual.

The testimony of New Mexico's State Engineer, S.E. Reynolds, at the October 16, 1987 hearing was not at odds with this conclusion. While Mr. Reynolds agreed that the Dike would no longer serve the physical function of impeding losses from McMillan after the dam is breached, he did testify to his understanding that the Commission changed the inflow-outflow equation to reflect its decision not to charge New Mexico with the salvage accomplished by the Dike. Tr. 70-75 (10/15/87). Whatever the Supreme Court may have decided about the 1947 condition in 1984 when it approved the Special Master's conclusions regarding Figure 1 of Texas Exhibit 68, the Court decided in 1987

that the salvage accomplished by the Dike should not be charged to New Mexico, presumably for the reason advanced in my Report (pp. 11-22) that the 1947 condition was modified by action of the Commission. Since the Commission's action provides no reason to distinguish between the 1950-1983 period and the 1987-forward period, the Texas contention is rejected.

B. Depletions Attributable to Man's Activities.

In its post-hearing brief, filed October 27, 1987, New Mexico argues strenuously, as it did at the October 15, 1987 hearing, that certain of the departures from the 1947 condition are due to the vagaries of the flow of the river and not to man's activities in New Mexico. As with its 30% proposal for administering the Compact, New Mexico's argument is that the 1947 condition curve is not completely accurate in representing the 1947 condition, and thus New Mexico should not be held responsible for departures from the curve absent a determination that the departures are due to man's activities. (New Mexico presents this proposal as an alternative to its 30% proposal. She contends that one or the other is necessary to address the problem of the erratic flow of the river.)

New Mexico realizes that this argument is a direct attack on the findings and conclusions recommended in my July 1986 Report and adopted by the Court in June 1987. I stated in my Report that I accepted the testimony of Dr. Murthy that his equations, as embodied in Texas Exhibit 79, accounted for all the natural losses in the system and that the remaining losses were thus attributable to man's activities. I am not prepared to reconsider this issue, although I recognize that a change in physical

circumstances my provide a basis in the future for an application by New Mexico to the River Master, the Pecos River Commission, or the Court for a change in the inflow-outflow equation. For example, in his testimony on October 15, 1987, Mr. Reynolds hypothesized a sudden increase in channel losses from one year to the next of 20,000 acre feet, owing to proliferation of salt cedars and deterioration of the channel. Tr. 53-56 (10/15/87). I suggested that such a change would require modification of the Manual and the witness seemed to agree. *Id.* at 55.

The inflow-outflow equation is not a formulation by an Einstein of an immutable law of physics: it expresses a relationship between inflows to the river and outflows at the state line, taking account of various natural losses before imputing the outflow that would have occurred under the 1947 condition. a flood like that in the winter of 1941-42 or a plague of salt cedars may require changes in the equation. With the Amended Decree in place and the River Master in office, a mechanism is available for making appropriate changes. I reject completely the notion that every year the River Master must determine the level of man's activities and their effect on the river's flow. If Dr. Murthy is correct, as I believe him to be, the task is as unnecessary as it is impossible.

New Mexico also objects to the deletion from Texas Exhibit 108 of language which was included in Texas Exhibit 108 and which related to the determination of the total depletions resulting from man's activities. New Mexico argues that Texas should be precluded from changing its theory of accounting at this late date. I am confident that Texas Exhibit 108 reflects no such change, and thus I reject New Mexico's argument.

During my service as Special Master, Texas has consistently taken the position that the calculations prescribed in Texas Exhibits 68, 79, and 108 account for all natural depletions of the stream so that any residual departure from the 1947 condition can be presumed to be the result of man's activities. It is true that Texas Exhibit 108 was submitted after Texas was informed that I had accepted her accounting theory, and yet it included provisions calling for a determination of depletions resulting from man's activities. Texas explains the inclusion of these provisions as nothing more than a contingency in case the Court refused to accept its theory and instead required a separate accounting I accept this explanation as entirely rational and credible. Furthermore, I do not believe that New Mexico was misled by the presence of the language in Texas Exhibit 108. New Mexico has known at least since March 18, 1986, when my Draft Report was circulated, that in my view Dr. Murthy's equations account for all natural losses, leaving residual losses to be attributed to man's activities in New Mexico.

The proposed Amended Decree and the Pecos River Master's Manual are submitted with this Report, and they incorporate the proposed findings and conclusions stated above.

Denver, Colorado, November ....., 1987.

Charles J. Meyers
Special Master

[Proposed Amended Decree And
Pecos River Master's Manual Are Omitted]

Supreme Court, U.S.
FILED
MAR 22 2004
OFFICE OF THE CLERK

34

No. 105, Original

In the Supreme Court of the United States

STATE OF KANSAS, PLAINTIFF

v.

STATE OF COLORADO

ON EXCEPTIONS TO THE FOURTH REPORT OF THE SPECIAL MASTER

BRIEF FOR THE UNITED STATES IN OPPOSITION TO THE EXCEPTIONS OF KANSAS

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QUESTIONS PRESENTED

The United States will address the following questions:

1. Whether the Court should appoint a "river master" to resolve computer modeling issues that may arise after entry of a contemplated decree in this case. (Kansas Exception 1).

2. Whether Kansas is entitled to prejudgment interest, accruing from 1985 forward, for damages resulting from Compact violations from 1950 to 1985. (Kansas Exception 2).

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In the Supreme Court of the United States

No. 105, Original

STATE OF KANSAS, PLAINTIFF

v.

STATE OF COLORADO

ON EXCEPTIONS TO THE FOURTH REPORT OF THE SPECIAL MASTER

BRIEF FOR THE UNITED STATES IN OPPOSITION TO THE EXCEPTIONS OF KANSAS

STATEMENT

The State of Kansas brought this original action against the State of Colorado to resolve disputes under the Arkansas River Compact, Act of May 31, 1949, ch. 155, 63 Stat 145 (Compact). This Court granted Kansas leave to file its complaint, *Kansas* v. *Colorado*, 475 U.S. 1079 (1986), and the Court appointed the Honorable Wade H. McCree, Jr., to serve as the Special Master. 478 U.S. 1018 (1986). Upon Judge McCree's death, the Court appointed Arthur L. Littleworth as the Special Master, 484 U.S. 910 (1987). Special Master Littleworth granted the United States' unopposed motion for leave to intervene in the action, conducted a trial limited to questions of liability, and submitted a report,

which recommended that the Court find that Colorado had violated the Compact in certain respects. 513 U.S. 803 (1994). This Court overruled the exceptions of both Kansas and Colorado to the Master's First Report. 514 U.S. 673 (1995).

The Master subsequently submitted a Second Report that addressed preliminary issues respecting a remedy, and the Court invited the parties to file exceptions. 522 U.S. 803 (1997). Colorado filed two exceptions, which were overruled without prejudice to Colorado's right to renew those exceptions at the conclusion of the remedy phase of the case. 522 U.S. 1073 (1998). After further proceedings, including a trial on the appropriate remedy for Colorado's violations of the Compact, the Master issued a Third Report, containing his recommended remedy for Colorado's violations of the Compact. 531 U.S. 921 (2000). Both Kansas and Colorado filed exceptions to the recommended remedy. The Court sustained, in part, one of Colorado's exceptions, pertaining to the calculation of prejudgment interest, and recommitted the case to the Master. 533 U.S. 1 (2001).

The Master conducted further trial proceedings and has now submitted his Fourth Report, which addresses the outstanding issues respecting an appropriate remedy. See 124 S. Ct. 951 (2003). Kansas has filed six exceptions to that report. The United States submits this brief to address two of Kansas's exceptions, pertaining to the appointment of a "river master" and calculation of prejudgment interest for the period from 1950 to 1985, and the United States urges that those exceptions be overruled. The United States takes no position on the remaining exceptions, which involve remedial issues of principal concern to Kansas and Colorado.

A. The Arkansas River Basin

The Arkansas River originates on the east slope of the Rocky Mountains in central Colorado and flows south and then east across Colorado and into Kansas. It receives significant in-flows from the Purgatoire River, its major tributary in Colorado, which originates in the Sangre de Cristo mountains in southern Colorado near the New Mexico border. The Purgatoire River flows in a northeasterly direction to join the Arkansas River about 60 miles west of the Kansas border, at Las Animas, Colorado. See *Kansas* v. *Colorado*, 514 U.S. at 675-676.

The United States has constructed three water storage projects on this river system. The John Martin Reservoir, located immediately east of the juncture of the Purgatoire and Arkansas Rivers in Colorado, is operated by the Army Corps of Engineers to control floods and to provide storage water in accordance with the Arkansas River Compact. It has a storage capacity of approximately 700,000 acre-feet. 514 U.S. at 677. The Pueblo Reservoir, located on the Arkansas River about 150 miles upstream of the Kansas border near Pueblo, Colorado, is managed by the Department of the Interior's Bureau of Reclamation as part of the Fryingpan-Arkansas Project. It has a storage capacity of approximately 357,000 acre-feet. *Ibid.* The Trinidad Reservoir, located on the Purgatoire River near Trinidad, Colorado, is jointly managed by the Army Corps of Engineers and the Bureau of Reclamation to control floods and to provide storage water for use by the Bureau of Reclamation's Trinidad Project. It has a storage capacity of approximately 114,000 acre-feet. *Ibid.*

Twenty-three canal systems in Colorado divert water from the Arkansas River below Pueblo Reservoir for irrigation. Fourteen of those systems are located upstream from John Martin Reservoir, and four of those systems have associated privately-owned, off-channel water storage facilities. Six canal systems in Kansas operate between the Colorado border and Garden City. See 514 U.S. at 677.

B. The Arkansas River Compact

The Arkansas River Compact apportions the Arkansas River between the States of Kansas and Colorado. The Compact was an outgrowth of two original actions that the States had filed in this Court disputing their respective entitlements to use of the Arkansas River. See 514 U.S. at 678. In each of those cases, the Court denied Kansas's request for an equitable apportionment. See *Kansas* v. *Colorado*, 206 U.S. 46, 114-117 (1907); *Colorado* v. *Kansas*, 320 U.S. 383, 391-392 (1943).

In the first suit, Kansas sought to enjoin water diversions in Colorado, but the Court denied relief on the ground that Colorado's depletions of the Arkansas River were insufficient at that time to warrant injunctive relief. *Kansas* v. *Colorado*, 206 U.S. at 114-117. In the second suit, Colorado sought to enjoin lower court litigation brought by Kansas water users against Colorado water users, while Kansas sought an equitable apportionment of the Arkansas River. The Court concluded that Colorado was entitled to the injunction it sought, but the Court concluded once again that Kansas had failed to show sufficient injury to warrant an equitable apportionment of the Arkansas River. *Colorado* v. *Kansas*, 320 U.S. at 391-392; see *Kansas* v. *Colorado*, 514 U.S. at 678.

In denying Kansas's second request for judicial relief, the Court suggested that a dispute such as the one between Kansas and Colorado calls for "expert administration rather than judicial imposition of a hard and fast rule," and it observed that the controversy "may appropriately be composed by negotiation and agreement, pursuant to the compact clause of the Federal constitution." *Colorado* v. *Kansas*, 320 U.S. at 392. Soon thereafter, the States approved, and Congress ratified, the Arkansas River Compact, Act of May 31, 1949, ch. 155, 63 Stat. 145. The Compact was intended to "[s]ettle existing disputes and remove causes of future controversy" between the States and their citizens over the use of the Arkansas River. To that end, the Compact was designed to

> [e]quitably divide and apportion between the States of Colorado and Kansas the waters of the Arkansas River and their utilization as well as the benefits arising from the construction, operation and maintenance by the United States of John Martin Reservoir Project for water conservation purposes.

Art. I, 63 Stat. 145. The Compact accomplishes those goals through two basic mechanisms.

First, the Compact protects the States' respective rights to continued use of the Arkansas River through a limitation on new depletions. Article IV-D of the Compact allows new development in the form of dams, reservoirs, and other water-utilization works in Colorado and Kansas, provided that the "waters of the Arkansas River" are not thereby "materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact." 63 Stat. 147. The Compact defines the term "waters of the Arkansas River," Art. III-B, 63 Stat. 146, but it does

not expressly define what constitutes a "material" depletion or a "usable" quantity.[1]

Second, the Compact regulates the storage of water at John Martin Reservoir and specifies the criteria under which each State is entitled to call for water releases from that reservoir. Article V of the Compact, which provides the "basis of apportionment of the waters of the Arkansas River," prescribes the timing of storage at the reservoir and the release criteria. 63 Stat. 147-149. Basically, between November 1 and March 31, in-flows to the John Martin Reservoir are stored, subject to Colorado's right to demand a limited amount of water. Between April 1 and October 31, the storage of water is largely curtailed, and either State may call for releases at any time in accordance with the flow rates set out in the Compact. *Ibid.*

The Compact creates an interstate agency, the Arkansas River Compact Administration, to administer the Compact. Art. VIII, 63 Stat. 149-151. The Compact Administration consists of a non-voting presiding officer designated by the President of the United States and three voting representatives from each State. It is

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[1] The full text of Article IV-D states as follows:

> This Compact is not intended to impede or prevent future beneficial development of the Arkansas River basin in Colorado and Kansas by Federal or State agencies, by private enterprise, or by combinations thereof, which may involve construction of dams, reservoirs, and other works for the purposes of water utilization and control, as well as the improved or prolonged functioning of existing works: Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction.

63 Stat. 147.

empowered to adopt by-laws, rules, and regulations, prescribe procedures for the administration of the Compact, and perform functions to implement the Compact. See Arts. VIII-B, VIII-C, 63 Stat. 149, 150. Article VIII-H of the Compact directs that the Administration shall "promptly investigate[]" violations of the Compact and report its findings and recommendations to the appropriate state official. 63 Stat. 151. That Article further states that it is "the intent of this Compact that enforcement of its terms shall be accomplished in general through the State agencies and officials charged with the administration of water rights." *Ibid.*

C. The Current Proceedings

Kansas brought this action in 1985 to enforce the provisions of the Arkansas River Compact. Special Master Littleworth filed his initial report with the Court in July 1994 addressing issues of liability. He recommended that the Court find that post-Compact well pumping in Colorado had violated Article IV-D of the Compact and that Colorado be held liable for that violation. The Master also recommended that the Court find no violation of the Compact with respect to Kansas's claims arising from the operation of the Trinidad Reservoir and the Winter Water Storage Program that utilizes excess storage capacity at the Pueblo Reservoir. The Court adopted all of the Master's recommendations and remanded for determination of the unresolved issues—primarily relating to what remedy, if any, Kansas was entitled to as a result of Colorado's breach. *Kansas* v. *Colorado*, 514 U.S. at 694; see Fourth Report 2-3.

On recommittal, the Master conducted further proceedings and issued a Second Report providing his

preliminary recommendations on the issues of: (a) quantifying the depletions in flows of the Arkansas River at the Colorado-Kansas border (stateline flows) for the period 1950-1985; (b) quantifying depletions for the period subsequent to 1985; (c) bringing Colorado into current compliance with the provisions of the Compact; and (d) a remedy for past depletions. The Court invited the parties to file exceptions to the recommendations contained in the Master's Second Report. See 522 U.S. 803 (1997). Kansas and the United States did not file any exceptions. Colorado challenged the Master's conclusions that (1) if the remedy includes money damages, the Eleventh Amendment of the United States Constitution does not bar an award of money damages based, in part, on losses incurred by Kansas's water users; and (2) the unliquidated nature of Kansas's claim for damages does not, in and of itself, bar the award of prejudgment interest. The Court overruled Colorado's exceptions without prejudice to Colorado's right to renew those exceptions at the conclusion of the remedy phase of the case. 522 U.S. at 1073-1074; see Fourth Report 3.

After conducting further proceedings, including a trial on the appropriate remedy for Colorado's violations of the Compact, the Master issued his Third Report, dated August 2000, containing his recommended remedy. The Master's Third Report calculated the total depletions of stateline flow for the period from 1950 to 1996 (428,005 acre-feet); it recommended that a suitable remedy for Kansas could include money damages based upon the economic losses of Kansas's water users; and it recommended that Kansas should be entitled to prejudgment interest, but only for those damages sustained after 1969, when Colorado knew or should have known that groundwater wells were

depleting streamflows. The Court overruled all of Kansas's and Colorado's exceptions but one: with respect to the calculation of prejudgment interest, the Court ruled that, as a matter of equity in this case, prejudgment interest should begin to accrue in 1985, when Kansas filed its complaint. See 533 U.S. at 15-16.

Upon recommittal, the Special Master conducted further trial proceedings and issued his Fourth Report, which contains 13 recommendations that, if accepted by the Court, would allow for entry of a final decree in this case. See Fourth Report 137-140. The Master has recommended a final measure of money damages and prejudgment interest and has proposed the adoption of various rules, credits, and measurement and modeling criteria for assessing future compliance. *Id.* at 137-139. In addition, the Master has recommended that the Court reject Kansas's proposals that the Court reopen issues respecting the Winter Water Storage program (which was addressed in the Master's First Report), *id.* at 137, that the Court establish an "Offset Account" to ensure Colorado's future compliance, *id.* at 139, and that the Court appoint a "river master" to administer the final decree in this case, *ibid.* Kansas alone has filed exceptions to the Master's Fourth Report.

INTRODUCTION AND SUMMARY OF ARGUMENT

The State of Kansas brought this action to enforce its rights under the Arkansas River Compact, which apportions the flow of the Arkansas River between Kansas and Colorado. This Court resolved the issues of liability in its earlier decision in *Kansas* v. *Colorado*, 514 U.S. 673 (1995), which accepted the Master's recommendation that Colorado be held liable for violations of Article IV-D of the Compact resulting from post-Compact well pumping in Colorado. In the subsequent

proceedings, the Master has focused on an appropriate remedy for those violations. The United States, which intervened in this action to address Kansas's challenges to the operation of federal projects on the Arkansas River, has played a diminished role in proceedings concerning an appropriate remedy for the post-Compact well pumping, which is a matter of primary concern for the States. The United States nevertheless has a significant institutional interest in the proper administration and enforcement of interstate compacts, and it participated in briefing and argument on several issues (including prejudgment interest) the last time the case was before the Court on exceptions to recommendations by the Master. The United States submits this brief to provide the Court with the federal government's perspective on two issues that bear on federal interests—whether the Court should appoint a "river master" to administer the final decree; and whether Kansas is entitled to prejudgment interest, beginning in 1985, for damages it suffered from Compact violations occurring before that date.

I. The Court should reject Kansas's request for the appointment of a river master to resolve anticipated issues respecting the use of a computer model measuring Colorado's future compliance with the Compact. This Court, on rare occasions, has appointed a river master to administer interstate water rights decrees, but that unusual step is not necessary in this case. Congress and the compacting States have created the Arkansas River Compact Administration, composed of representatives from Kansas and Colorado and chaired by a non-voting federal representative, to administer the Compact. The Administration is the appropriate body to resolve complex technical issues respecting the computer model that will be used to measure

Colorado's compliance with its Compact obligations. The States should employ that body, as Congress envisioned, to provide expert administration and resolve disputes through consensual mechanisms. Appointment of a separate river master is not appropriate in these circumstances, and would likely promote continued adversarial proceedings and prolong this litigation.

II. The Court should also reject Kansas's approach to the calculation of prejudgment interest, which would subject damages accruing before 1985 to prejudgment interest commencing in that year. This Court determined in its 2001 decision that Kansas was entitled to prejudgment interest only from 1985 forward. See *Kansas* v. *Colorado*, 533 U.S. at 14-16. In reaching that conclusion, the Court relied on the States' prior determination that prejudgment interest would not be applied to damages accruing before the date that prejudgment interest began to run. The Master correctly concluded that he should retain that calculation methodology, which reflected the understanding of the States and this Court in the prior proceedings. That approach, which would result in an award to Kansas of approximately $29 million for damages from 1950 to 1994 (measured in 2002 dollars) provides a fair result in light of the equities in this case.

ARGUMENT

I. THIS COURT SHOULD NOT APPOINT A RIVER MASTER TO ADMINISTER THE FINAL DECREE

The Special Master and the parties have determined that Colorado's future compliance with the Arkansas River Compact should be determined, in part, by use of a computer program, known as the Hydrologic-Institutional Model (H-I Model), which was developed for

purposes of this litigation. The H-I Model estimates the flow of the Arkansas River that would have occurred in the absence of post-Compact well pumping. That estimated streamflow is then used to determine whether Colorado has met its obligation under Article IV-D of the Compact of ensuring that any new water development in Colorado has not materially depleted the Arkansas River's flow at the Colorado-Kansas border.

As the Master explained, the task of modeling the Arkansas River Basin is extraordinarily complex. Fourth Report 109-110. The Master found that, despite continuing refinements, the H-I Model is not accurate on an annual basis or short-term basis. *Id.* at 109-115. He therefore adopted Colorado's proposal that the H-I Model results be applied over a ten-year period to average out errors. *Id.* at 116-120.[2] He also anticipated that there would be a continuing need to update the H-I Model as experience revealed opportunities for improving it, but that the States might disagree on what changes should be made. *Id.* at 121-124. In response, Kansas proposed that the Court should appoint a river master to resolve those disputes on a continuing basis. See *id.* at 125. Colorado objected to that proposal on the ground that the result would be "to continue this litigation indefinitely." *Ibid.* The Master rejected Kansas's proposal, concluding that such an appointment was not appropriate in this case. See *id.* at 125-136. Kansas excepts from the Master's recommendation. Kan. Br. 10-25.

The United States agrees with the Special Master's recommendation that appointment of a river master is not appropriate in the circumstances presented here.

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[2] Kansas has excepted from that recommendation. See Kan. Br. 35-45. The United States takes no position on that exception.

As the Master acknowledged, this Court appointed a river master in *Texas* v. *New Mexico*, 482 U.S. 124, 134-135 (1987), to apply a formula for apportioning the Pecos River's flows, and in *New Jersey* v. *New York*, 347 U.S. 995, 1002-1004 (1954), to make flow calculations in administering a decree respecting the Delaware River. See Fourth Report 125-128, 129-130. But as a general matter, the Court has "taken a distinctly jaundiced view of appointing an agent or functionary to implement [its] decrees." *Texas* v. *New Mexico*, 482 U.S. at 134. See *Vermont* v. *New York*, 417 U.S. 270, 274-277 (1974).[3]

The Court has appointed a river master with continuing authority to administer a decree only in instances in which there was a clear need or desirability for such an appointment. In *Texas* v. *New Mexico*, the Court appointed a river master, at the suggestion of the special master, because, otherwise, "the natural propensity of these two States to disagree if an allocation formula leaves room to do so" would lead to "a series of original actions to determine the periodic division of the water flowing in the Pecos." 482 U.S. at 134. In *New Jersey* v. *New York*, the Court appointed a river master, as recommended in the report of the special master, 347 U.S. at 995-996, to perform what the Court has since characterized as essentially "ministerial acts," *Vermont* v. *New York*, 417 U.S. at 275.

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[3] As the Master explained, the Court has rejected the appointment of a river master or similar agent in *Wisconsin* v. *Illinois*, 281 U.S. 179, 198 (1930); *New Jersey* v. *New York*, 283 U.S. 805 (1931); *Wyoming* v. *Colorado*, 298 U.S. 573, 586 (1936); and *Vermont* v. *New York*, 417 U.S. at 277. See Fourth Report 130-131.

In this case, by contrast, the Master concluded that the appointment of a river master to resolve computer modeling issues could be counter-productive:

> None of the interstate water cases supports the appointment of a River Master with authority to decide the kinds of issues that may still arise with respect to continued compliance with the Arkansas River Compact. Any such issues are not likely to be simply "ministerial" in nature. If a River Master is appointed with sufficiently broad authority to resolve modeling issues, it simply becomes easier to continue this litigation. But it is in the opposite direction that movement is needed.

Fourth Report 135-136.

The Master's reluctance to recommend appointment of a river master charged with deciding complex, technical issues of computer-based streamflow modeling is understandable for additional reasons bearing on this Court's responsibility to supervise such agents. If the Court elected to review the river master's determinations with the same care that it examines a special master's findings of fact, see *Colorado* v. *New Mexico*, 467 U.S. 310, 317 (1984), the Court would need to devote its limited resources to reviewing highly technical scientific and engineering issues of limited national significance. Alternatively, if the Court elected to defer broadly to the river master's determinations, it would put in place a quasi-judicial officer with indefinite tenure who would exercise largely unreviewable discretion. It is only in the "rare case" that the Court creates such an office. See *Vermont* v. *New York*, 417 U.S. at 275.

More fundamentally, the appointment of a river master is neither desirable nor necessary because there

is an available and preferable alternative. The Arkansas River Compact establishes the Arkansas River Compact Administration to administer the Compact, to adopt rules and regulations and prescribe procedures for that purpose, and to "[p]erform all functions required to implement this Compact and to do all things necessary, proper, or convenient in the performance of its duties." Art. VIII-B, 63 Stat. 149-150. The Compact further provides that violations of any provisions of the Compact "or other actions prejudicial thereto" shall be promptly investigated by the Administration. Art. VIII-H, 63 Stat. 151. The Administration, which has been charged by Act of Congress and agreement between the States with responsibility for implementing the Compact, is the appropriate body to resolve issues respecting any necessary modifications of the H-I Model, which will be utilized specifically to determine Colorado's compliance with its obligations under the Compact.

Kansas has objected to enlisting the Compact Administration's assistance based on its prediction that the Administration, which is composed of a non-voting federally appointed chairman and three representatives from each State, would inevitably deadlock, as was the situation in the case of the Pecos River Compact Commission. See Kan. Br. 12-14, 24-25; see also *Texas* v. *New Mexico*, 482 U.S. at 133, 134. The Master concluded that this prediction was not warranted, stating:

> To be sure, the Compact Administration can act only by unanimous vote. But the climate may be changing. The Compact Administration, under the chairmanship of the United States' representative, may again be seen as the best way to administer the compact and settle issues. After some thirteen

> years of litigation, the major issues between the states have already been determined or will be determined as a result of this Report. If there are future issues, it is to be hoped that the parties will have a greater appreciation for the Court's oft-stated admonition that litigation of these cases "is obviously a poor alternative to negotiation." *Texas* v. *New Mexico*, 462 U.S. 554, 567, fn.13, and 575, citing numerous cases.

Fourth Report 136.

Congress and the States created the Compact Administration to provide the "expert administration" that this Court envisioned in *Colorado* v. *Kansas*, 320 U.S. at 392. They required the Compact Administration to act by unanimous vote because they recognized the value of resolving interstate disputes by consensus. They also presumably recognized that consensus would sometimes be difficult to achieve, but that is no reason for failing to undertake the effort to reach agreement through the procedures that the Compact provides. Indeed, the Compact specifies an optional mechanism for breaking deadlocks:

> In a case of a divided vote on any matter within the purview of the Administration, the Administration may, by subsequent unanimous vote, refer the matter for arbitration to the Representative of the United States or other arbitrator or arbitrators, in which event the decision made by such arbitrator or arbitrators shall be binding upon the Administration.

Art. VIII-D, 63 Stat. 150. Additionally, the Compact does not preclude the parties from engaging in other mechanisms of alternative dispute resolution, such as non-binding mediation, which was successfully employed in *Kansas* v. *Nebraska*, No. 126, Original, to negotiate a comprehensive resolution of that case. See *Kansas* v. *Nebraska*, 538 U.S. 720 (2003) (decree approving final settlement stipulation); Second Report of the Special Master (Final Settlement Stipulation), *Kansas* v. *Nebraska*, No. 126, Original (Apr. 15, 2003).[4]

The United States accordingly urges that the Court overrule Kansas's proposal for the appointment of a river master to administer the anticipated decree in this case. Instead, the Court should direct the Master to propose a decree, with the assistance of the parties, that would provide that the parties may seek resolution of disputes over the revision of the H-I Model through recourse to the Compact Administration.

II. KANSAS IS NOT ENTITLED TO PREJUDGMENT INTEREST, BEGINNING IN 1985, FOR DAMAGES IT SUFFERED FROM COMPACT VIOLATIONS OCCURRING BEFORE THAT DATE

In the prior proceedings, the Court faced the question whether, and to what extent, Kansas was entitled to prejudgment interest on the money damages that it will receive on account of Colorado's past violations of the Compact. See *Kansas* v. *Colorado*, 533 U.S. at 9-16. The United States addressed that issue in response to Kansas's and Colorado's competing excep-

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[4] As the Master recognized, in recent interstate water disputes, the States have increasingly employed alternative means of dispute resolution to resolve pending or anticipated disputes. See Fourth Report 132-135. The United States has encouraged the use of such techniques in original actions, such as *Nebraska* v. *Wyoming*, No. 108, Original, and *Kansas* v. *Nebraska*, No. 126, Original, as a means to defuse or resolve interstate disputes that might otherwise lead to motions for leave to invoke this Court's original jurisdiction.

tions, urging that this Court may award prejudgment interest as a matter of discretion based on the equities of the case. Because Kansas and Colorado now disagree on the proper interpretation of the Court's 2001 decision, the United States offers its perspective on what the Court decided.

In its 2001 decision, the Court determined that it may award prejudgment interest in an original action arising from an interstate compact, even if the money damages at issue are unliquidated at the time of suit. *Kansas* v. *Colorado*, 533 U.S. at 9-11. The Court also decided for what years prejudgment interest would accrue. Kansas argued that the accrual of interest should begin in 1950, when Colorado's violations commenced, while Colorado argued that any prejudgment interest should not begin to accrue until 1985, when Kansas first filed its complaint. The Master concluded that prejudgment interest should begin to accrue in 1969, when, according to the Master, Colorado knew or should have known that it was violating the Compact. See *id.* at 12.

The Court ultimately rejected the Master's recommendation and concluded that prejudgment interest should begin to accrue in 1985, rather than 1969. The Court explained:

> The choice between the two dates is surely debatable; it is a matter over which reasonable people can—and do—disagree. After examining the equities for ourselves, however, a majority of the Court has decided that the later date is the more appropriate.

533 U.S. at 15 (footnote omitted).[5] The Court additionally stated:

> Given the uncertainty over the scope of damages that prevailed during the period between 1968 and 1985 and the fact that it was uniquely in Kansas' power to begin the process by which those damages would be quantified, Colorado's request that we deny prejudgment interest for that period is reasonable.

Id. at 16. The Court accordingly sustained Colorado's exception "insofar as it challenges the award of interest for the years prior to 1985." *Ibid.*

On recommittal of the case to the Special Master, Colorado argued that the Court's 2001 decision entitled Kansas to prejudgment interest only on those damages that accrued after 1985. Kansas, by contrast, argued that the Court's 2001 decision also entitled it prejudgment interest, beginning in 1985, on the damages that accrued during the period from 1950 through 1985. The difference in those positions has a substantial impact on the amount of damages. Under Colorado's approach, the total damage award for the 1950 to 1994 period, adjusted for inflation, is $28,998,366 (in 2002 dollars), while under Kansas's approach, the total

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[5] The Court explained in an accompanying footnote that Justices O'Connor, Scalia, and Thomas believed that no award of prejudgment interest was appropriate, while the Chief Justice and Justice Kennedy believed that prejudgment interest should run from the date of filing the complaint. 533 U.S. at 15 n.5. Justices Stevens, Souter, Ginsburg, and Breyer agreed with the Special Master that prejudgment interest should run from 1969, but "[i]n order to produce a majority for a judgment, the four Justices who agree with the Special Master have voted to endorse the position expressed in the text." *Ibid.*

damage award for that period is $52,879,927 (in 2002 dollars). See Fourth Report 7. The Master concluded that Colorado's calculation correctly implements this Court's decision. See *ibid.*; *id.* at App. 7-15. The United States agrees.

As the Master explained, in the proceedings leading up to the Court's 2001 decision, both Kansas and Colorado demonstrated an understanding that prejudgment interest would be applied only to those damages that accrued after the date on which prejudgment interest commenced. See Fourth Report App. 12. In particular, the Master directed the States to calculate the total amount of damages under the Master's recommendation that prejudgment interest commence in 1969. The States concluded that the total damages for the period from 1950 to 1994 was approximately $38 million (in 1998 dollars), and that information was conveyed to this Court. *Ibid.* In reaching that conclusion, the States "treated damages for the period from 1950-68 as being completely exempt from any interest reflecting lost investment opportunities." Fourth Report App. 13. For that period, Kansas was to receive only an adjustment of the damages to account for inflation, which Colorado had always proposed. *Id.* at 10; see 533 U.S. at 9 n.2. "In essence, the states followed the methodology now urged by Colorado, except they were dealing with 1969 instead of 1985." *Ibid.* In filing exceptions to the Master's Third Report, Kansas did not challenge the use of that methodology if the Court concluded (contrary to Kansas's submission) that prejudgment interest should accrue in 1969 or 1985.[6]

[6] In opposing the States' exceptions, the United States shared their understanding that the Master had recommended imposition of prejudgment interest only on damages accruing after 1968. See Brief for the United States in Opposition to the Exceptions of Kansas and Colorado, *Kansas* v. *Colorado*, No. 105, Original (Jan. 2001), at 27 ("Based on his finding that by 1968 Colorado knew, or should have known that post-compact wells were causing material depletions of usable stateline flows, the Master recommended that Kansas be awarded actual damages for the period from 1950 to 1968, adjusted for inflation only. For the period from 1969 to the date of judgment, the Master recommended that Kansas be awarded prejudgment interest.").

The Master properly concluded that, when this Court determined that prejudgment interest would commence in 1985, rather than in 1969, the Court did not intend to change the method by which the States had determined to calculate the interest award. As the Master recognized:

> Clearly there was no sentiment on the Court to increase damages, including prejudgment interest, over the amount recommended in my Third Report. Indeed, the final action of the Court was to reduce my recommended award.

Fourth Report App. 14. The damage award that would result from the application of the Master's proposed approach—approximately $29 million for the period from 1950 to 1994 (in 2002 dollars)—is consistent with the amount of damages that the Court envisioned would be awarded in this case. See *Kansas* v. *Colorado*, 533 U.S. at 9 n.2.

Kansas suggests that the Master's approach is inconsistent with the methods used in calculating prejudgment interest in other cases, outside this Court's original jurisdiction, in order to compensate fully the plaintiff for the delay in payment by the defendant. Kan. Br. 28-29. But even if that is so, this original

action, with its unique history and equities, is sui generis. See *Kansas* v. *Colorado*, 533 U.S. at 13-16. The Court has considerable discretion to award or withhold prejudgment interest based on the equities of a particular case. Consistent with that approach, the Court's prior decision in this case rejected Kansas's arguments based on a "rigid theory of compensation for money withheld," *id.* at 15, and reflects an intention to retain the methodology that the parties had employed for calculating prejudgment interest in the wake of the Master's Third Report, while providing that prejudgment interest would commence in 1985. See *id.* at 16 ("[W]e sustain [Colorado's] objection insofar as it challenges the award of interest for the years prior to 1985.").

The United States accordingly urges the Court to overrule Kansas's exception respecting the Master's calculation of prejudgment interest. The Master was justified in concluding that the Court intended to exempt all damages occurring before the suit was filed from prejudgment interest reflecting lost investment opportunities. See Fourth Report App. 14. Damages occurring before that date remain subject to an adjustment for inflation, to which Colorado has always agreed. See *id.* at 11. That result is fair, particularly in light of the uncertainties attending the availability of money damages and prejudgment interest as a remedy for violation of an interstate compact at the time the Arkansas River Compact was negotiated. See 533 U.S. at 20-26 (O'Connor, J., concurring in part and dissenting in part).

CONCLUSION

The exceptions of Kansas respecting the appointment of a river master and the award of prejudgment interest should be overruled.

Respectfully submitted.

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In The
Supreme Court of the United States

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

and

UNITED STATES OF AMERICA,

Defendant-Intervenor.

On Exceptions To The Fourth Report Of The Special Master

REPLY BRIEF OF COLORADO OPPOSING THE EXCEPTIONS OF KANSAS

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REPLY BRIEF OF COLORADO OPPOSING THE EXCEPTIONS OF KANSAS

INTRODUCTION

This original action is before the Court for the fourth time on Kansas' exceptions to the Special Master's Fourth Report. In its June 11, 2001 opinion, this Court denied all exceptions to the Special Master's Third Report, except for granting Colorado's request to deny prejudgment interest between 1969 and 1985, and remanded the case to the Special Master "for preparation of a final judgment consistent with this opinion." *Kansas v. Colorado*, 533 U.S. 1, 20 (2001).

The Fourth Report addresses the issues that remained after the Court's June 11, 2001 opinion and contains thirteen recommendations. The last recommendation is that the case be remanded for preparation of a final decree in accord with the prior opinions of the Court in this case and the recommendations in the Report, or as the Court may otherwise determine. Fourth Report 139-40, ¶13. During the most recent trial segment, which lasted for 56 trial days, the Special Master heard the testimony of 40 witnesses and received 279 exhibits. *Id.* at 1. Many of the witnesses were called by Colorado to describe the replacement plans and sources of replacement water that were used by well associations in Colorado to replace well pumping depletions to the Arkansas River in accordance with rules and regulations adopted by the Colorado State Engineer that became fully effective in 1997. *Id.* at 8-24. The 140-page Fourth Report addresses the issues raised during the trial segment as well as calculating damages and prejudgment interest in accordance with the Court's June 11, 2001 opinion. *Id.* at 1-2. In a separate order, the

Special Master resolved a disagreement between the States on the calculation of prejudgment interest. *Id.* at 2.

Although Colorado does not fully agree with every recommendation made by the Special Master in his Fourth Report, Colorado did not file exceptions to the Report and supports the Special Master's recommendations as a fair and reasonable approach to bring an end to this case. Special Master Arthur L. Littleworth has served as Special Master in this case since 1987 and has heard all of the evidence in this case. With the sole exception of granting Colorado's request to change the date for the commencement of prejudgment interest, the Court has denied all exceptions to the Special Master's previous reports, which is a reflection of the careful and thoughtful consideration the Special Master has given to the issues during this long and complex case.

As the Special Master recognized, the appointment of a river master with sufficiently broad authority to resolve the kinds of modeling issues that may still arise in the future would facilitate continuing this litigation. Fourth Report 136. Colorado agrees with the Special Master that movement in the opposite direction is needed, *id.*, and Colorado proposed binding arbitration as an alternative to litigation of future modeling disputes. *Id.* at 135. Kansas rejected binding arbitration as a "surrender of an important constitutional right" under Article III, Section 2, of the U.S. Constitution, *id.*, but other methods suggested by the Special Master may bear fruit once Kansas' exceptions have been resolved. *See id.* at 136.

Kansas has raised six exceptions to the Special Master's Fourth Report, which are addressed in this reply brief.

SUMMARY OF ARGUMENT

1. **River Master**. The Special Master recommended that the Court deny Kansas' request for the appointment of a river master because none of the interstate water cases supported the appointment of a river master with authority to decide the kinds of issues that may still arise with respect to continued compliance with the Arkansas River Compact. He concluded that the river master appointed in *Texas v. New Mexico*, 482 U.S. 124 (1987), does not adjudicate the kinds of disputes that may be involved in future application of the H-I model. He also noted that the duties of the river master appointed in *New Jersey v. New York*, 347 U.S. 995 (1954), are limited to making flow calculations and monitoring reservoir releases in order to maintain the applicable minimum rate of flow downstream. Further, the Special Master concluded that appointment of a river master with sufficiently broad authority to resolve modeling issues would make it easier to continue this litigation and that movement in the opposite direction is needed. The Special Master's recommendation that the Court deny Kansas' request for the appointment of a river master is consistent with the Court's precedents and fully supported by the reasons set forth in the Fourth Report.

2. **Prejudgment Interest**. The Special Master correctly interpreted the Court's intent in its June 11, 2001 opinion granting Colorado's request to change the date for awarding prejudgment interest from 1969 to 1985. Kansas' argument that it should be entitled to the investment income that it could have earned if the 1950-84 damages had been paid in 1985 is based on a rigid theory of compensation for money withheld that the Court rejected in its June 11, 2001 opinion. Kansas' argument is

also inconsistent with the Court's statement that the Special Master had acted properly in carefully analyzing the facts of the case and in only awarding as much prejudgment interest as was required by a balancing of the equities.

3. **Period to Determine Compact Compliance**. The Special Master's acceptance of Colorado's proposal to use the results of the H-I model over a 10-year period to measure Compact compliance is fully supported by his findings that the H-I model is not sufficiently reliable on a short-term basis to determine compliance as recommended by Kansas and that Colorado's proposal provides a reasonable way to check on the effectiveness of Colorado's Use Rules to prevent material depletions to usable Stateline flows. Moreover, the Special Master's findings on the reliability of the H-I model are consistent with his previous conclusions about the H-I model during the liability phase, which this Court approved in its 1995 opinion.

4. **Deference to Colorado Water Courts**. The Special Master concluded that it is unnecessary, at this time, to decide the final amount of replacement plan credits for the Lower Arkansas Water Management Association's 1997-99 replacement plans, based on his finding that Colorado was in compliance with the Arkansas River Compact for the 1997-99 period without relying on the full amount of those credits and on his recommendation that future Compact compliance be determined over a longer period of time sufficient for the Colorado water court to act. His recommendation that the Court should defer to the Colorado water court to determine the terms and conditions on the changes of water rights to replacement use, including the amounts of replacement credits, is consistent with Article VI-A(2) of the Arkansas River Compact and the

wise use of this Court's time and resources. The Special Master recognized that the determinations by the Colorado water court would not preclude Kansas from seeking review under the Court's original jurisdiction, but the Colorado water court's determinations could make such review unnecessary.

5. **1997-99 Compliance**. The Special Master's recommendation that the Court approve his findings that implementation of Colorado's Use Rules, and the replacement water provided thereunder, brought Colorado into compliance with the Compact for the 1997-99 period is fully supported by the Special Master's finding that the H-I model is not accurate or reliable on an annual basis.

6. **Unresolved Issues**. The Special Master properly concluded that it was unnecessary at this time to resolve the fifteen disputed issues listed by Kansas, which include disputed H-I model calibration issues, 1997-99 accounting issues, and future compliance issues. The Special Master found that Colorado was not in violation of the Arkansas River Compact for the 1997-99 period, that future compliance will be determined over a longer period of time sufficient for the Colorado water court to act, and that additional evidence will be available that might make it unnecessary to resolve these issues in the future.

ARGUMENT

I. THE SPECIAL MASTER'S RECOMMENDATION THAT THE COURT DENY KANSAS' REQUEST FOR THE APPOINTMENT OF A RIVER MASTER IS CONSISTENT WITH THE COURT'S PRECEDENTS AND IS FULLY JUSTIFIED BY THE REASONS SET FORTH IN THE FOURTH REPORT.

Kansas states that the H-I model has become a necessary element of the enforcement of the Arkansas River Compact with regard to post-Compact pumping in Colorado. Kan. Br. 10. Based on the precedent of *Texas v. New Mexico*, 482 U.S. 124, 134 (1987), Kansas requested that a river master be appointed to administer the decree in this case. Kan. Br. 10. The Special Master concluded that the river master appointed in *Texas v. New Mexico* does not adjudicate the kinds of disputes that may be involved in future application of the H-I model, Fourth Report 128, and that none of the interstate water cases supported the appointment of a river master with authority to decide the kinds of issues that may still arise with respect to continued compliance with the Arkansas River Compact. *Id.* at 135-36. Further, the Special Master concluded that appointment of a river master with sufficiently broad authority to resolve future modeling issues would make it easier to continue the litigation and that movement in the opposite direction was needed. *Id.* at 136. The Special Master therefore recommended that the Court deny Kansas' request to appoint a river master and recommended instead that the Court retain jurisdiction for a limited period of time. *Id.* at 139, ¶12.

Kansas takes exception to the Special Master's recommendation that the Court deny its request to appoint a

river master. In support of its exception, Kansas argues that a river master is necessary to implement a decree of the Court in this case because the H-I model requires annual updating and may need to be modified. Kan. Br. 12. Kansas also argues that a procedure is needed to resolve ongoing disagreements over use of the H-I model, that this Court is the only court with the requisite jurisdiction to resolve such disputes, and that a series of original actions to resolve these issues can be anticipated, placing an unnecessary burden on the Court and on the States unless a river master is appointed. *Id.* at 13. The Special Master considered these arguments, but rejected Kansas' request, in part because the river master appointed in *Texas v. New Mexico* "does not adjudicate the kinds of disputes that may be involved in future application of the H-I model." Fourth Report 128.

Kansas argues, however, that the river master appointed in *Texas v. New Mexico* (the "Pecos River Master") is required to use "a fair degree of judgment in quantifying tributary flood waters, salvaged water and unappropriated flood waters, all of which are components of the calculation of New Mexico's obligations to deliver water at the stateline," and states that the Pecos River Master "even has the authority to modify the Pecos River Master's Manual itself, subject to review on clearly erroneous grounds by the Court." Kan. Br. 17. Kansas contends that this gives the Pecos River Master "the authority, on the motion of one or both of the States and subject to review, to modify the quantitative standard for delivery of water at the stateline on the Pecos River," and that this "is the same function as performed by the H-I Model in this case." *Id* at 18. (internal quotation marks omitted).

The Special Master concluded, however, that there was a significant difference between the duties performed by the Pecos River Master and the duties that a river master would have to perform in this case. In *Texas v. New Mexico*, disputes over the accuracy of the inflow-outflow methodology prescribed in the Pecos River Compact were settled when the Special Master in that case recommended a new curve and table that established the relationship between the inflow of the Pecos River in New Mexico and the required outflow at the stateline. Fourth Report 126; *see* Kan. Br. App. A-22 (setting forth the inflow-outflow equation). A successor Special Master then recommended that the Court enjoin the Pecos River Commission, or appoint a river master, "to make the calculations provided for in this Decree." Fourth Report 126-27. The Court chose to appoint a river master "to make the required periodic calculations." *Texas v. New Mexico*, 482 U.S. at 134. The Pecos River Master was also given authority to decide on proposed but contested changes to the Pecos River Master's Manual, which specifies factors that may need to be employed to adjust the computed departures in the Compact compliance calculations and the procedures to compute such departures. Kan. Br. App. A-23, A-93 to 94. But the Pecos River Master does not have the authority to adopt a methodology different from the inflow-outflow method, because that is the method specified in the Pecos River Compact. *Texas v. New Mexico*, 462 U.S. 554, 572-74 (1983). Only the Pecos River Commission may adopt a different method. *Id.*

In this case, the Arkansas River Compact does not specify a method for determining whether post-Compact development in Colorado has materially depleted usable Stateline flows in violation of the Compact. The H-I model

is simply a tool developed by Kansas to determine the impacts of post-Compact pumping in Colorado on Stateline flows. Fourth Report 121; *see Kansas v. Colorado*, 514 U.S. at 685, 686 (1995) (the Kansas hydrologic model was developed to estimate total depletions to establish that development in Colorado had resulted in depletions of usable river flow.) The H-I model has been revised several times during the course of this litigation, and, as the Special Master notes, the changes called for in his Fourth Report will require new calibration efforts. *Id.* at 123-24. As he further points out, "all experts agree that continued improvements need to be made to the model to increase its reliability." *Id.* at 123. Thus, this is not a case where the Court could appoint a river master to make required calculations pursuant to a methodology specified in the Compact or a formula decreed during the litigation. *See id.* at 124 ("Nor is the Court in a position to direct technically how the model should be calibrated in future updates.") Nor could a river master simply operate the model if the experts for the States failed to agree on changes. *Id.* at 128 (describing the complexity of the model and the lack of documentation on the assumptions used in the model and how it operates). Moreover, major disputes over the future use of the model are not likely to involve issues of basic data collection that a river master could determine if the states disagreed. *Id.* Thus, the Special Master correctly concluded that the appointment of a river master in *Texas v. New Mexico* to make periodic calculations did not support the appointment of a river master to decide the different and more complex kinds of issues that may still

arise with respect to continued compliance with the Arkansas River Compact. *Id.* at 128, 135-36.[1]

Next, Kansas argues that precedents other than *Texas v. New Mexico* support the appointment of a river master in this case. Kan. Br. 20-21. Kansas appears to concede that the modeling and data analysis that would be required if a river master were appointed in this case would require more judgment than exercised by the river master appointed in *New Jersey v. New York*, 347 U.S. 995 (1954) (the "Delaware River Master"). *Id.* However, Kansas

[1] The Pecos River Master's function is largely ministerial, except when a contested change in the River Master's Manual is proposed; but, in that case, it was expected that the proposed changes would raise technical issues of hydrology and statistics, as to which the River Master would have expertise. As Special Master Charles J. Meyers stated in his 1987 report:

> *Unless and until a change is proposed in the [River Master's] Manual, the River Master's function is largely ministerial, although some judgment may be required from time to time in the selection of numerical values.* The need for sound judgment will arise when one party seeks to modify the Manual without the concurrence of the other party. The Amended Decree does not empower the River Master to initiate changes in the Manual. . . . [T]he River Master is . . . delegated the power to decide in the first instance the propriety of proposed but contested changes in the Manual. *For the most part, these proposed changes are likely to raise technical issues of hydrology or statistics, as to which the River Master will have expertise. Because of that expertise, the recommended standard of review is whether the River Master's findings or conclusions are clearly erroneous.*

Kan. Br. App. A-93 to A-94 (emphasis added) (1987 report of Special Master Charles J. Meyers, in *Texas v. New Mexico* recommending a proposed Amended Decree in *Texas v. New Mexico* providing for the appointment of a river master and setting forth the river master's duties).

argues that, even if true, that "is all the more reason to appoint a river master on the Arkansas and not leave implementation of the decree to a series of original actions." *Id.* at 21. What Kansas fails to appreciate is the fundamental difference between the limited judgment exercised by the Delaware River Master in performing his duties and the expansive functions that a river master would have to perform to resolve disputes over the H-I model in this case. Fourth Report 128, 130, 135-36. Special Master Littleworth noted that while the Delaware River Master may not be given strictly "ministerial" acts to perform, the duties are limited to making flow calculations and monitoring reservoir releases in order to maintain the applicable minimum rate of flow downstream, *id.* at 130, and concluded that the appointment of a river master with such limited duties did not support the appointment of a river master with much broader duties in this case. *Id.* at 135-36.

Next, Kansas argues that the only case cited by the Special Master in which a river master or some type of continuing enforcement authority has been denied is *Vermont v. New York*, 417 U.S. 270 (1974) (per curiam). Kan. Br. 22. Kansas argues that there are "decisive differences" between the *Vermont* case and this case and that the considerations that caused the Court to deny the appointment of a master in that case do not exist here. *Id.* at 22-23. Kansas relies on the Court's concern in *Vermont v. New York* that the appointment of a master pursuant to a stipulated decree might result in the master submitting "proposals having no relation to law" or no relation to the Court's performance of its Article III functions. 417 U.S. at 277. Kansas asserts that because this case does not present the same risk, *Vermont v. New York* is inapposite.

However, in the opinion, the Court also reviewed other cases in which the Court had denied requests to appoint a commissioner or a river master and said that *New Jersey v. New York* was a "rare case" where the Court had appointed a river master. *Id.* at 275. The *Vermont* Court also noted that the Delaware River Master was given only ministerial acts to perform, such as reading gauges and measuring flow, *id.*, and said that in *New Jersey v. New York*, "[a]ll that remained was to supervise the application of the various formulas which the Court had decreed, based on findings of fact." 417 U.S. at 275-76.

Thus, *Vermont v. New York* supports Special Master Littleworth's conclusion that the exceptions where the Court has appointed a river master have been cases where a river master has clearly defined duties to perform to implement a decree, not cases where a river master would have to resolve the kinds of issues that may still arise in this case. Fourth Report 135-36. Moreover, while there may be future modeling disputes, the Special Master, who has served in this case for 17 years, considered whether the appointment of a river master would be likely to encourage negotiation to resolve such disputes or would simply make it easier to continue the litigation. *Id.* at 136. The Special Master's view on this point merits consideration by the Court, and his recommendation that the parties consider negotiation or arbitration to resolve future modeling disputes, *id.* at 135-36, is consistent with this Court's precedents. *E.g.*, *Arizona v. California*, 373 U.S. 546, 564 (1963) (stating the Court's "often expressed preference that, where possible, States settle their controversies by mutual accommodation and agreement") (internal quotations omitted); *Colorado v. Kansas*, 320 U.S. 383, 392 (1943) ("Mutual accommodation and agreement

should, if possible, be the medium of settlement, instead of invocation of our adjudicatory power.")

The Court expressed similar concerns in an earlier decision in *Texas v. New Mexico*, 462 U.S. 554 (1983), when it rejected a recommendation that either the United States Commissioner or some other third party be given the tie-breaking vote on the Pecos River Commission. *Id.* at 564-65. The Court noted that it had "expressly refused to make indefinite appointments of quasi-administrative officials to control the division of interstate waters on a day-to-day basis, even with the consent of the States involved." *Id.* at 566 (citations omitted). Similarly, the Court stated: "Continuing supervision by this Court of water decrees would test the limits of proper judicial functions, and we have thought it wise not to undertake such a project." *Id.*, citing *Vermont v. New York*, 417 U.S. at 277.[2]

Finally, Kansas argues that while settlements of other cases are to be commended, it cannot reasonably be presumed that disputes will abruptly stop after more than a century of intermittent but continual disputes between the two States. Kan. Br. 24-25. The disputes in the earlier half of the last century were over the equitable apportionment of

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[2] While the Court ultimately appointed a river master in *Texas v. New Mexico*, 482 U.S. 124 (1987), the Court did not discount the factors stated in its 1983 opinion. In fact, it specifically stated that in the past, the Court has expressed a strong reluctance to appoint a river master. *Id.* at 134. The Court noted, however, that in exceptional circumstances, a river master may be necessary, and the Court deemed it appropriate in that situation. *Id.* However, by that point in the case, disputes over the accuracy of the inflow-outflow methodology prescribed in the Pecos River Compact had been settled and the River Master's function was largely ministerial.

the Arkansas River. *See Kansas v. Colorado*, 514 U.S. 673, 678 (1995) (describing the previous litigation). In 1943, the Court suggested that the States resolve their differences by negotiation and agreement, *Colorado v. Kansas*, 320 U.S. 383, 392 (1943), which they did in the Arkansas River Compact. *See Kansas v. Colorado*, 514 U.S. at 678. The Compact obviously did not eliminate all disputes, but the current lawsuit has been protracted primarily because of the difficulties in quantifying depletions to usable State-line flows from post-Compact well development. *See* Fourth Report at 109 ("Modeling the Arkansas River Basin in Colorado is extraordinarily difficult, and perhaps unprecedented."); *id.* at 110 (noting that Dr. R. Allen Freeze, one of the distinguished pioneers in computer modeling, had explained the difficulties of the task and "cautioned that large errors could be expected in this complex modeling process."). However, as the Special Master notes, the major issues in this case have been determined or will be determined as a result of the Fourth Report, *id.* at 136, although litigation to this point has not resolved every kind of modeling issue that may arise in the future. *Id.* at 121-23. In Colorado's view, the Special Master's recommendation offers a greater prospect that future modeling disputes will be resolved through negotiation and agreement. *See id.* at 136. Further, the States have an incentive to resolve future modeling disputes by negotiation and agreement because litigation to resolve modeling disputes would be very time-consuming and expensive, as this case has amply demonstrated.

Colorado acknowledges that the issue of how to reasonably assure that Colorado will continue to meet its compact obligations is not an easy one. However, the issue is not different in kind from other cases where a defendant

has been found to have violated a federal law or constitutional provision. In difficult cases involving constitutional violations, such as school desegregation cases, federal courts have retained jurisdiction for considerable periods to ensure compliance with equitable remedies. *Freeman v. Pitts*, 503 U.S. 467, 487-92 (1992). But even in those cases, a court's jurisdiction normally ends when it is shown that a defendant has attained the requisite degree of compliance. *Id.* Colorado recognizes that there are unresolved issues regarding the use of the H-I model, but limited arbitration is available under the provisions of the Arkansas River Compact. Arkansas River Compact, art. VIII-D. This would restore control of the administration of the Compact to the Arkansas River Compact Administration, a role it was intended to perform under the Compact. *Id.*, art. VIII-H; Fourth Report 136. As an alternative, Colorado has proposed binding arbitration as a means to resolve such issues. In either case, arbitration could incorporate the use of technical arbitrators or advisors.

While it is conceivable that a series of original actions may be necessary to resolve future modeling disputes, the appointment of a river master with authority to resolve such disputes would not eliminate the possibility of litigation. In fact, the Special Master concluded that it would make it easier to continue the litigation. Fourth Report 136. Nor is this a case where cooperation by the parties has been impossible because of the protracted litigation. Prior to the most recent trial segment, the Special Master noted that "[t]he relations between the States during the course of this trial have been generally marked by exemplary

cooperation. Agreements have been reached on some issues that otherwise would have been extremely expensive and time consuming to try." Fourth Report App. 33.[3] The Special Master has encouraged the States to work cooperatively to improve data inputs to the model. Fourth Report at 53. In addition, he recognized that as more data is developed in the Arkansas River Valley, adjustments to the new Kansas potential evapotranspiration values "in accordance with recognized professional procedures may be appropriate." *Id.* at 79. The Special Master also noted that the Arkansas River Compact Administration provides an avenue to resolve disputes. *Id.* at 136; *see also* Fourth Report App. 33. Absent an agreement for binding arbitration, this process provides a reasonable prospect for resolving future disputes without the need for recourse to this Court.

Colorado agrees with the Special Master that appointment of a river master would encourage rather than discourage continued litigation and that movement in the opposite direction is needed. Kansas has not shown that this case fits the rare circumstances where appointment of a river master would be appropriate. The Special Master's recommendation that the Court deny Kansas' request for

[3] On the other hand, the litigious attitude of Texas and New Mexico was clearly a factor that led to the appointment of a river master in *Texas v. New Mexico*. *See, e.g., Texas v. New Mexico*, 482 U.S. at 134 ("The natural propensity of these two States to disagree if an allocation formula leaves room to do so cannot be ignored."); Kan. Br. App. A-97 ("New Mexico realizes that this argument is a direct attack on the findings and conclusions recommended in my July 1986 Report and adopted by the Court in June 1987."); *id.* at A-98 ("I reject completely the notion that every year the River Master must determine the level of man's activities and their effect on the river's flow.")

the appointment of a river master is consistent with the Court's precedents and fully justified by the reasons set out in the Fourth Report.

II. THE SPECIAL MASTER'S ORDER CORRECTLY INTERPRETED THE COURT'S INTENT WHEN IT SUSTAINED COLORADO'S REQUEST TO CHANGE THE DATE FOR AWARDING PREJUDGMENT INTEREST.

The Special Master in his Order of December 2, 2002 (which is printed as Exhibit 2 in the Appendix to the Fourth Report) granted Colorado's motion to determine the amount of damages and prejudgment interest for the 1950-94 period as $28,998,336 in 2002 dollars. Fourth Report App. 8. Kansas excepts to this ruling. Based on its interpretation of the Court's June 11, 2001 opinion, Kansas contends that the amount should be $52,879,927. *Id.*

The Special Master concluded that Kansas' theory for calculating prejudgment interest was inconsistent with the methodology used by the States to calculate the total amount of damages and prejudgment interest that he had directed following his Third Report. Fourth Report App. 12-13. That amount, which the States had conveyed to the Court in their briefs, totaled approximately $38 million. *Id.* The Special Master accordingly concluded that Kansas' theory was inconsistent with the clear intent of the Court to limit the application of prejudgment interest when it granted Colorado's request to change the date that prejudgment interest should begin to accrue from 1969 to 1985. *Id.* at 13-15. The Special Master correctly determined this issue.

In his Third Report, the Special Master concluded that there was no categorical bar to the award of prejudgment interest on an unliquidated claim of damages for violation of the Arkansas River Compact, but concluded that prejudgment interest "should not be awarded according to [any] rigid theory of compensation for money withheld, but rather should respond to 'considerations of fairness.'" *Kansas v. Colorado*, 533 U.S. 1, 13 (quoting Third Report 97) (internal quotation marks and citation omitted). For reasons stated in his Third Report, the Special Master concluded that prejudgment interest should be included in this case at the rates proposed by Kansas, but only from 1969 when Colorado knew or should have known that post-Compact well pumping was violating the Compact. Third Report 103, 107 (Sections XI.C, D, and E of the Third Report are reprinted in the Appendix to this brief). The Special Master further rejected Kansas' position that full interest rates should apply to the damages from 1950-68 when neither state saw any wrongdoing or thought that Compact violations were occurring. *Id.* at 106. The Special Master pointed out that only with hindsight and the benefit of sophisticated computer modeling could Stateline depletions be found to have occurred during those early years. *Id.* He also took into account the long delay in this case and the dramatic impact of compounding over so many years. *Id.* at 102-03. The Special Master recommended the inclusion of prejudgment interest, but only on the damages that had occurred from 1969 to the date of judgment. *Id.* at 107. He recommended that the damages for the period 1950-68 be adjusted for inflation (which Colorado had always proposed), "but should not bear compound interest reflecting the loss of use of those monies." *Id.* This Court agreed that "the Special Master [had] acted properly in carefully analyzing the

facts of the case and in only awarding as much prejudgment interest as was required by a balancing of the equities." 533 U.S. at 14.

Kansas now argues that the Court, in granting Colorado's request to deny the award of prejudgment interest on damages for the period between 1968 and 1985, intended to overrule the Special Master's recommendation that the damages prior to that period should be adjusted only for inflation. Kan. Br. 31-32. Kansas recognizes that the issue is a matter of what the Court intended in its June 2001 opinion, *id.* at 27-28, but nevertheless argues that prejudgment interest should be awarded on all damages beginning in 1985 based on a rigid theory of compensation for money withheld. *Id.* at 28-29, 31. In terms of consequences, this is no small matter. The difference in 2002 dollars is $24 million. Fourth Report App. 11. Moreover, under Kansas' current theory, Colorado would have been better off if the Court had rejected all of its exceptions to the Third Report, rather than partially granting its request to change the date for the commencement of prejudgment interest. *Id.* at 14. Not surprisingly, Colorado disagrees with Kansas' argument, as did the Special Master. *Id.* at 15.

In its exceptions to the Third Report, Kansas argued that the accrual of prejudgment interest should begin in 1950. 533 U.S. at 12. Colorado did not take an exception to the Special Master's recommendation that the damages from 1950-68 should be adjusted for inflation only to the date of judgment, but did request that if prejudgment interest was to be awarded as recommended by the Special Master, the date for awarding prejudgment interest should be moved back from 1969 to 1985. *Id.* at 15. The Special Master's reasons for not awarding prejudgment interest on

damages occurring from 1950-68 until the date of judgment included the fact that in the early years after the Compact was signed, neither State had seen any wrongdoing or thought Kansas was not receiving its compact share of usable flows of the Arkansas River. Third Report 106. In addition, he noted that ordinarily when prejudgment interest is denied, only "nominal" damages (i.e., damages unadjusted for inflation) would be recovered, but here Colorado had proposed that a fair and equitable remedy would adjust all damages for inflation. *Id.* at 107. The Court agreed that "the Special Master acted properly in carefully analyzing the facts of the case and in only awarding as much prejudgment interest as was required by a balancing of the equities." 533 U.S. at 14. If Kansas' interpretation of the Court's opinion were correct, this statement would not be accurate, because the Special Master would not have awarded as much prejudgment interest as was required by a balancing of the equities.

Moreover, in granting Colorado's request to change the date for the award of prejudgment interest, the Court noted:

> Once it became obvious that a violation of the Compact had occurred, it was equally clear that the proceedings necessary to evaluate the significance of the violations would be complex and protracted. Despite the diligence of the parties and the Special Master, over 15 years have elapsed since the complaint was filed.

533 U.S. at 16. Thus, not only were the facts before the complaint was filed relevant to the equitable considerations, but the Court expressly stated that the complex and protracted nature of the proceedings necessary to evaluate

Kansas' claim after the complaint was filed was also a consideration.

Kansas nevertheless argues that the change of the date by this Court reflected a "fundamental shift" between the rationale relied upon by the Special Master and the rationale on which the Court settled in determining that interest should begin to accrue in 1985. Kan. Br. 32. Kansas argues that the basis for the Court's ruling was that Colorado "indisputably was on notice of Kansas' claims once it was served with Kansas' complaint." *Id.* Kansas argues that it will be denied the investment income it could have earned after 1985 on damages for the years 1950-84 if those damages are adjusted for inflation only and that Kansas should be entitled to the investment income because, if Colorado had promptly paid the judgment, Kansas could have invested the money itself. *Id.* at 31 ("Since 1985 . . . it has been uniquely in Colorado's power to protect against the running of interest, whether by tendering a sum of damages to Kansas or by placing the sum in an interest-bearing trust fund."); *id.* at 34 ("Were it possible to avoid litigation delay, a judgment could have been entered for Kansas in 1985 for the damages incurred as of that time, adjusted for inflation only.")

As a preliminary matter, Kansas' argument omits the fact that Kansas did not request damages in its original complaint and did not amend its complaint to request damages until May 1989. First Report 18-19. More importantly, even in 1985 when Kansas filed its motion for leave to file the complaint, it was clear, as the Court said, that the proceedings necessary to evaluate the significance of the violations would be complex and protracted. 533 U.S. at 16. In 1985, Colorado had no idea of the amount of the depletions that had occurred or the amount of damages

that might be awarded. The development of a model to quantify depletions was still several years in the future, and the Kansas H-I model had to be substantially revised during the liability phase before it produced reliable results. First Report 230-40, 245-47 (describing the development of the H-I model and the problems encountered).[4] The Kansas experts then had to revise the model for the 1986-94 update to correct errors. Second Report 21-22. They also made additional changes during the most recent trial segment. Fourth Report 50-53, 54-55, 81-83. And, even today, all experts agree that continued improvements need to be made to the model to increase its reliability. *Id.* at 123. Thus, adjusting the damages for the violations that occurred prior to 1985 for inflation only is fair and equitable because there was nothing that Colorado could do in 1985 to stop the past violations that had occurred when no one had any thought that violations had occurred or when the nature and extent of Colorado's violations were unclear. And, even after Kansas filed its motion for leave to file the complaint, the proceedings necessary to quantify the amount of the depletions were necessarily complex and protracted.

[4] In his First Report, the Special Master stated: "The major changes in Kansas' position and evidence cannot be ignored. For some five years the Kansas experts worked to accumulate the necessary data and to develop the H-I model in order to support the State's claims. Yet after Colorado's cross-examination during trial uncovered numerous errors and shortcomings in the Kansas evidence, and after the trial recess caused by Durbin's hospitalization, Kansas' replacement experts testified to substantially different conclusions than those resulting from the original H-I model." First Report 236-37 (footnote omitted.)

Colorado has always proposed that a fair and equitable remedy would adjust the damages for inflation, thereby ensuring that, at the date of judgment, the dollar value of the damages for the 1950-84 period will be equal to the value of the damages when they occurred. What Kansas argues is that it should also be entitled to the *investment* income that it could have earned if the 1950-84 damages had been paid in 1985. The Special Master concluded that it would not be fair and equitable to award compound interest on the damages that occurred prior to 1969, Third Report at 106-07, and that the Court had not intended to alter his recommendation when it granted Colorado's request to deny prejudgment interest during the period between 1968 and 1985. Fourth Report App. 14-15. The Court's statement that "the Special Master acted properly in carefully analyzing the facts of the case and in only awarding as much prejudgment interest as was required by a balancing of the equities," 514 U.S. at 14, fully supports the Special Master's interpretation of the Court's intent.

III. THE SPECIAL MASTER'S ACCEPTANCE OF COLORADO'S PROPOSAL TO USE THE RESULTS OF THE H-I MODEL OVER A 10-YEAR PERIOD TO MEASURE COMPACT COMPLIANCE IS FULLY SUPPORTED BY THE FINDINGS AND CONCLUSIONS IN THE FOURTH REPORT.

The Special Master concluded that use of the H-I model over a ten-year period, as proposed by Colorado, is necessary to achieve reasonably accurate model results and that Colorado's proposal provided a reasonable way to check the effectiveness of the rules and regulations

adopted by the Colorado State Engineer (Colorado's Use Rules) to prevent material depletions of usable Stateline flows. Fourth Report at 120. Kansas takes exception to the Special Master's recommendation on the basis that "the Compact contemplates an accounting period no longer that one year." Kan. Br. 36.

The Special Master accepted Colorado's proposal based on his finding that "the H-I model is not sufficiently reliable on a short term basis to determine compliance as recommended by Kansas." Fourth Report at 109. The Special Master reviewed the Kansas statistical evidence and the testimony of Kansas' chief modeling expert, Mr. Steven P. Larson, *id.* at 110-112, and concluded that the statistical evidence "does not convincingly support the accuracy of the H-I model on an annual or a short-term basis." *Id.* at 110. He also reviewed the testimony of Dr. Charles M. Brendecke,[5] an expert who testified for Colorado on the issue of model reliability. *Id.* at 113. Dr. Brendecke presented an error analysis of the H-I model results, using commonly used statistical concepts, *id.* at 113-15, and it was his overall conclusion that the H-I model, as it now operates, should not be used on a short-term basis, but could be used over a longer period of time, perhaps 10 to 15 years, to determine compliance. *Id.* at 115.

[5] Dr. Brendecke holds a Ph.D. in civil engineering from Stanford University. Fourth Report 113. He was an expert witness for Wyoming in the recent case of *Nebraska v. Wyoming* and served as a consultant on technical issues to the Special Master in *Texas v. New Mexico*. *Id.* He has extensive modeling experience in other river basins. *Id.* His qualifications are found in Colorado Exhibit 1440.

In addition to Dr. Brendecke's testimony, the Special Master noted that there are "innumerable exhibits which plainly show that in any given month or year the model predictions of diversion or river flows differ substantially from actual measured data." *Id.* at 115. Based on his review of the evidence, the Special Master concluded:

> Only by using longer term averages do the model simulations more closely match historic data. I find that the H-I model is not sufficiently accurate on a short-term basis to be used to determine compact compliance on a monthly or annual basis.

Id.

The Special Master then reviewed Colorado's compact compliance proposal, which relies on Colorado's Use Rules to require replacement water based on presumptive depletion factors, with the H-I model being used to determine Compact compliance over a 10-year period. *Id.* at 116-20. The Special Master concluded that the use of the H-I model over a 10-year period, as proposed by Colorado, is necessary to achieve reasonably accurate model results and that Colorado's proposal provided a reasonable way to check upon the effectiveness of Colorado's Use Rules to prevent material depletions of usable Stateline flows. *Id.* at 120; *see id.* at 139, ¶ 11 (recommendation that the Court approve his conclusions accepting Colorado's proposal).

Kansas argues, however, that a compliance period of one year or less is a critical element of its compact entitlement. Kan. Br. 37-40. This overlooks the fact that the model developed by Kansas to determine if there are depletions to usable Stateline flows is not sufficiently accurate or reliable on a short-term basis to determine

whether there have been depletions or accretions (i.e., increases) to usable Stateline flows in any particular month or year. *See Kansas v. Colorado*, 514 U.S. at 686 (the Special Master properly rejected the Spronk usable flow analysis because it required the H-I model to do something it was not designed to do, i.e., predict depletions accurately on a monthly basis.) Colorado's proposal requires that replacement water be provided on an ongoing basis. Fourth Report 19-20. The flaw in Kansas' argument is that no one can determine, using the H-I model, whether those replacements are or are not adequate to prevent such depletions on an annual basis. *See Kansas v. Colorado*, 514 U.S. at 684 (depletions shown by the Kansas model were well within the model's range of error; as a result, "[o]ne [could not] be sure whether impact or error [was] being shown." (citation omitted)); *id.* at 686 ("But, as Durbin, Kansas' first expert, testified, Kansas' hydrological model was only a 'good predictor' when 'looking at long periods of time.'" (internal quotation marks and citation omitted)).

Kansas argues, however, that the existence of uncertainty with regard to the inflow-outflow methodology in *Texas v. New Mexico* did not prevent the Court from ordering "a very specific standard to determine compact compliance on the Pecos River." Kan. Br. 40. This argument misunderstands the source of the inflow-outflow methodology that is used to determine compact compliance on the Pecos River. Article IV of the Pecos River Compact provides as follows:

> (c) Unless and until a more feasible method is devised and adopted by the Commission the inflow-outflow method, as described in the Report of the Engineering Advisory Committee, shall be used to:
>
> (i) Determine the effect on the state-line flow of any change in depletions by man's activities or otherwise, of the waters of the Pecos River in New Mexico.

Pecos River Compact, art IV(c)(i), quoted in *Texas v. New Mexico*, 462 U.S. at 571-72. It was determined in *Texas v. New Mexico* that the curve provided by the original Inflow-Outflow Manual did not accurately describe the correlation between inflows and the state-line outflow under the 1947 condition established by the Compact. 462 U.S. at 573. The Court rejected a proposal by Texas to simplify the process of drawing a new curve by reducing the index flows to a single directly measurable value because it was not consistent with the intent of the Compact's framers. *Id.* at 574. The Court held that the Pecos River Commission was free to adopt such an approach under the Compact, but the Court could not apply such an approach against New Mexico in the absence of Commission action. *Id.* Instead, the litigation resulted in drawing a new curve, like the old one but using more accurate data. Thus, the use of the inflow-outflow method was what Texas and New Mexico had agreed to in the Pecos River Compact to determine the effects on stateline flows of any change in depletions by man's activities. *Id.* at 572. The existence of uncertainty with regard to the inflow-outflow methodology was not relevant because the States had agreed in the Compact that the inflow-outflow method would be used unless and until the Commission adopted a more feasible approach. *See id.* at 564 ("[U]nless the compact to which Congress has consented is somehow unconstitutional, no

court may order relief inconsistent with its express terms.")

In this case, the Arkansas River Compact does not specify that the H-I model, or any other method, shall be used to determine whether a future development causes depletions to usable Stateline flows. *See* First Report 106 n. 41 (noting that "[t]he Arkansas River Compact contrasts sharply with the Pecos River Compact adopted by New Mexico and Texas about the same time, namely 1948.") Rather, Article IV-D of the Compact provides that it is not intended to impede or prevent future beneficial development, "Provided, that the waters of the Arkansas River, as defined in Article III, shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas under this Compact by such future development or construction." Arkansas River Compact, art. IV-D, quoted in *Kansas v. Colorado*, 533 U.S. at 5.

The H-I model was developed by Kansas to quantify depletions to usable Stateline flows from post-Compact well pumping, *see Kansas v. Colorado*, 514 U.S. at 685, 686, but the Special Master has determined that it is not accurate or reliable to determine Compact compliance on a short-term basis, and Kansas does not dispute that finding. Moreover, this finding is consistent with the Special Master's previous rulings on the model's reliability, which were approved by this Court in its 1995 opinion. *Id.* at 684, 686-87.

Further, Colorado's proposal was not to ignore the need for Compact compliance for 10 years, then run the model once every 10 years and replace any depletions in the following year. It was to make replacements on an ongoing basis based on the presumptive depletion factors

in Colorado's Use Rules, to run the model annually to keep track of the depletions and accretions predicted by the model, and to use the model results over a ten-year period, making up any net depletion in the eleventh year or carrying forward any net accretion into the eleventh year, with the process continuing on a moving ten-year basis. Fourth Report at 117. Therefore, even if the Compact contemplates an accounting period no longer than one year, Colorado's proposal provides for annual replacement, with periodic adjustments when warranted. *Id.* at 118. The H-I model is simply not sufficiently accurate to determine that Compact compliance is or is not being met on an annual or short-term basis.[6]

Kansas also argues that the annual depletions by Colorado beginning in 1950 were determined and used as the basis for the Special Master's determinations and have been utilized in the determination of damages. Kan. Br. 43-44. The States used the annual depletions for the purpose of calculating damages, but the Special Master never determined that the annual results of the model were accurate or reliable for the purpose of determining Compact compliance.

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[6] Thus, there is no need for the Court to determine whether the Compact contemplates an accounting period no longer than one year. Previously, the Special Master had noted that the Trinidad Project had been analyzed originally on the basis of net average impacts on inflow to John Martin Reservoir, without objection from Kansas. First Report 428. While the Special Master agreed with Kansas that the use of averages may sometimes be inappropriate, he did not resolve the issue because he concluded that Kansas had failed to prove its claim. *Id.* at 431. This Court agreed and overruled Kansas' exception to the Special Master's dismissal of its Trinidad Reservoir claim. *Kansas v. Colorado*, 514 U.S. at 683.

In his First Report, the Special Master was not able to determine the amount of the depletions to usable Stateline flows, First Report 263, but nonetheless rejected the Spronk Usable Flow method for use with the H-I model results because that method assumed that the model could accurately predict changes of Stateline flows on a monthly basis. *Id.* at 302-05. This Court agreed with the Special Master's rejection of the Spronk Usable Flow method on that basis. 514 U.S. at 686-87. On remand, Kansas and Colorado stipulated to the amount of depletions to usable Stateline flow caused by post-Compact well pumping in Colorado for the period 1950-85 using the H-I model. Second Report App. 36-39. Kansas then modified the model, and, in his Second Report, the Special Master determined that the depletions for the period 1986-94 were 91,565 acre-feet, Second Report 112, but made no finding that the annual depletions calculated with the model were accurate or reliable.

In his Third Report, the Special Master recommended that the depletions for the 1995-96 period be determined to be 7,935 acre-feet, bringing the total depletions for 1950-96 to 428,005 acre-feet, Third Report 119, but again made no finding that the annual depletions were accurate or reliable.[7] The Special Master now has specifically addressed the accuracy and reliability of the H-I model on an annual basis and has found that it is not accurate or reliable on an annual or a short-term basis. That conclusion is fully consistent with the Special Master's prior

[7] The States entered into a stipulation to determine the impacts in Kansas resulting from the annual depletions to usable Stateline flows to facilitate the determination of damages. Third Report 8-9, 46.

conclusions regarding the Winter Water Storage Program and the Spronk usable flow analysis, *Kansas v. Colorado*, 514 U.S. at 684, 685-87, and is amply supported by the findings in the Fourth Report. Moreover, Colorado's proposal for Compact compliance is consistent with the Compact, even if the Compact contemplates accounting on an annual basis.

IV. THE SPECIAL MASTER'S RECOMMENDATION REGARDING DETERMINATION OF THE AMOUNTS OF REPLACEMENT PLAN CREDITS IS CONSISTENT WITH THE ARKANSAS RIVER COMPACT AND THE COURT'S ROLE.

The Special Master recommends "[t]hat the final amounts of Replacement Plan credits to be applied toward Colorado's compact obligations shall be the amounts determined by the Colorado Water Court, and any appeals therefrom." Fourth Report 138, ¶9. Kansas takes exception to this recommendation, arguing that these issues are critical to Kansas' rights under the Compact and that the Special Master's recommendation "would assign the determination of issues critical to resolving a dispute between the States to a Colorado state court, in a proceeding to which Kansas is not even a party." Kan. Br. 45, 46. Kansas does not quote the Special Master's full recommendation, which makes it clear that he fully understood that "the Colorado Water Courts are [not] empowered to make a final determination on any matter essential to compact compliance at the Stateline, or that Colorado's reliance on such Water Court actions will necessarily satisfy its compact obligations." Fourth Report 138, ¶9. Rather, his recommendation was to defer to the Colorado

water court's determinations, in part to avoid the possibility of inconsistent judgments, because the Colorado water court would have to consider the effect of the changes of water rights on senior surface water rights in Colorado in any event. *Id.* at 94.

In Section VIII of his Report, the Special Master fully explained the reasons that it made sense, given Colorado's system of water courts, with specialized water judges, to defer to the proceedings before the Colorado water court. *Id.* at 93. In a pending change of water rights proceeding, the water judge will examine precisely the kinds of issues that Kansas has raised concerning the credits the Lower Arkansas Water Management Association (LAWMA)[8] should be allowed for certain water rights that it has acquired for replacement use. *Id.* at 93; *see Santa Fe Trail Ranches Property Owners Ass'n v. Simpson*, 990 P.2d 46, 52-54 (Colo. 1999) (describing Colorado's procedures to determine changes of water rights and applicable standards).

The Special Master concluded that deferring to the Colorado water courts to make such determinations in the first instance was consistent with Article VI-A (2) of the Arkansas River Compact, which provides: "Except as otherwise provided, nothing in this Compact shall be construed as supplanting the administration by Colorado of the rights of appropriators of waters of the Arkansas River in said State as decreed to said appropriators by the courts of Colorado, . . ." Fourth Report 93. The Special

[8] LAWMA is one of the well associations that prepares replacement plans for its members. *See* Fourth Report 13-14, 15 n. 2.

Master noted that Colorado has established a system of water courts, with specialized water judges, to examine precisely the kinds of issues involved in LAWMA's acquisition of water rights and that all such changes in water rights must be approved under Colorado law by the water court. *Id.; cf. Frontier Ditch Co. v. Southeastern Colo. Water Conservancy Dist.*, 761 P.2d 1117 (Colo. 1988) (affirming water judge's dismissal of an application for determination of a water right by a canal that diverts in Colorado for irrigation in Kansas because Kansas has exclusive jurisdiction over the canal and its headworks under Article VI-B of the Compact).

The Special Master therefore concluded that it was unnecessary, at this time, for this Court to determine the final amount of the credits that LAWMA should be allowed in its 1997-99 replacement plans. *Id.* at 94. He found that while Kansas is not a party to the water court proceedings, major Colorado canal companies were likely to protest or appear in the water court proceedings and that those canal companies have essentially the same interests as Kansas in preventing any expansion of use by LAWMA. *Id.* at 95. However, he noted, "None of these determinations . . . precludes Kansas from seeking review under the Court's original jurisdiction." *Id.* at 94; *see also id.* at 138-39 ("All replacement credits, no matter how determined, are subject to the right of Kansas to seek relief under the Court's original jurisdiction.").

Colorado agrees with the Special Master that it is consistent with Article VI-A(2) of the Compact and a wise use of this Court's time and resources to defer any determination of disputed replacement credits pending the outcome of the Colorado water court proceedings. *Cf. Colorado River Water Cons. Dist. v. United States*, 424

U.S. 800, 817, 819-20 (1976) (considerations of wise judicial administration and clear federal policy evinced by the McCarran Amendment supported dismissal of separate federal court actions to adjudicate water rights).[9] In most cases, the disputes relate to whether specific farm fields were historically irrigated by the water rights or shares in mutual ditch companies that LAWMA has acquired for replacement use and the amount of consumptive use credits for such water rights. Fourth Report 23, 92; *see also id.* at 10-17 (describing sources of replacement water and organizations that acquire replacement water). Kansas has also raised issues about the terms and conditions that should be imposed on the changes of such water rights and shares. *Id.* at 23. LAWMA has filed an application with the Colorado water court, which will have to address these issues to determine whether the changes will injure Colorado water rights. *Id.* at 93-94. Rather than resolve such issues, the Special Master recognized that the Colorado water court will have to determine these issues in any event and that this Court need not do so at this time. *Id.* at 93-94; 138-39, ¶9. The Special Master's recommendation is consistent with Article VI-A (2) of the

[9] The difference between *Colorado River* and this case is that the Court would not abstain from exercising jurisdiction here but simply postpone any action pending the outcome of the Colorado water court proceedings. *Cf. Illinois v. City of Milwaukee*, 406 U.S. 91, 93 (1972) ("It has long been this Court's philosophy that 'our original jurisdiction should be invoked sparingly.' *Utah v. United States*, 394 U.S. 89 [(1969)].")

Compact and the wise use of this Court's time and resources.[10]

V. THE SPECIAL MASTER'S FINDING THAT IMPLEMENTATION OF COLORADO'S USE RULES FOR THE 1997-99 PERIOD BROUGHT COLORADO INTO COMPLIANCE WITH THE COMPACT IS SUPPORTED BY THE MASTER'S FINDING THAT THE H-I MODEL IS NOT ACCURATE OR RELIABLE ON AN ANNUAL BASIS.

The Special Master recommends that the Court approve his finding that implementation of Colorado's Use Rules, and the replacement water provided thereunder, brought Colorado into compliance with its obligations under the Compact for the period 1997-99. Fourth Report 137, ¶4. Kansas takes exception to this recommendation on the basis that it depends on whether Compact compliance is to be measured over a period greater than one year. Kan. Br. 47. Kansas argues that an accounting period longer than one year is not consistent with the Compact, *id.*, and states that its evidence, which was accepted by the Special Master for the purpose of this recommendation, showed a depletion of usable Stateline flows (and,

[10] Colorado courts also consider the impact of a change of water rights on Kansas' rights under the Arkansas River Compact. *Southeastern Colo. Water Conservancy Dist. v. Fort Lyon Canal Co.*, 720 P.2d 133, 150 (Colo. 1986) (reversing and remanding decrees for further factual findings regarding injury to other appropriators or violations of the Arkansas River Compact).

hence, a violation of the Compact) in 1997. *Id.*[11] However, the Special Master rejected Kansas' position that the model was sufficiently accurate to determine Compact compliance on an annual basis. Fourth Report 109-15. That finding is fully supported by the findings in the Fourth Report and is consistent with his conclusions during the liability phase. *See pages* 23-31, *supra; Kansas v. Colorado*, 514 U.S. at 684 (overruling Kansas' exception to the Special Master's conclusion that Kansas had failed to prove its claim regarding the Winter Water Storage Program); *id.* at 685-86 (overruling Kansas' exception to the Special Master's conclusion regarding the best of several methods to determine usable flow with the Kansas H-I model).

[11] The depletion of usable Stateline flows shown in Table 14 of Kansas Exhibit 1093, which is included as Exhibit 10 in the Appendix to the Fourth Report, is in 1998 rather than 1997. *See* Fourth Report 28. Over the whole three-year period, as found by the Special Master, the Kansas model did not indicate a shortage, but showed that usable accretions exceeded depletions by 2,819 acre-feet. *Id.* These results did not include replacement credits that Kansas agreed should have been allowed. *Id.* at 25. Nor did they include other changes that the Special Master has directed. *Id.* at 25-26. Nor do they include over 11,000 acre-feet of water that had been placed in the Offset Account in John Martin Reservoir for the benefit of Kansas, but which spilled. *Id.* at 26.

VI. THERE IS NO NEED FOR THE COURT TO DIRECT THE SPECIAL MASTER TO MAKE RECOMMENDATIONS ON THE FIFTEEN ISSUES LISTED BY KANSAS. THE SPECIAL MASTER PROPERLY CONCLUDED THAT IT WAS UNNECESSARY TO RESOLVE THOSE ISSUES AT THIS TIME.

Finally, Kansas states that the Special Master has recommended that Compact compliance be determined "using the version of the model approved at the conclusion of this trial segment," but made no recommendation on fifteen issues currently pending before him that are necessary to implement the H-I model or otherwise determine Compact compliance. Kan. Br. 47, quoting Fourth Report 117-18.[12] Kansas states that these are issues on which evidence and argument have been submitted and that continue to be disputed by the States. *Id.* Kansas argues that without a decision on the fifteen disputed issues, it is not possible to implement an "approved" version of the model or determine Compact compliance. *Id.* Kansas has grouped the fifteen disputed issues into three categories: (1) H-I model calibration issues, (2) 1997-99 accounting issues, and (3) future compliance issues. *Id.* at 48-49.

The Special Master concluded that it was unnecessary to resolve these issues for two reasons. First, with respect

[12] The quotation from the Fourth Report in the Kansas brief is a summary of Colorado's proposal during the trial, Fourth Report at 117-18, rather than the recommendation made by the Special Master, who recommended various changes to the model and directed the experts from both States to confer on others. *See id.* at 52-53, 79, 83-92.

to the disputed H-I model calibration issues and the disputed 1997-99 accounting issues, the Special Master concluded that resolution of these issues was not necessary to evaluate Compact compliance for 1997-99. Fourth Report 30-31. For that purpose, he relied on the Kansas model results for 1997-99, *id.* at 30-31, 94, which used Kansas' figures for irrigated acreage, supplemental acreage, and replacement water credits. *Id.* at 24-26, 94. Based on the Kansas evidence, he found that Colorado was not in violation of the Arkansas River Compact during the 1997-99 period. *Id.* at 31-32, 94.

Second, he found that future compact compliance, as he recommended, will be determined over a longer period of time sufficient for the Colorado water court to act. *Id.* at 94. The Special Master recommended that the Court retain jurisdiction for a limited period of time beyond the initial ten-year period that was part of Colorado's proposal for Compact compliance, thus providing an opportunity to determine how Colorado's Use Rules operate under different hydrologic conditions and, if necessary, to resolve modeling disputes, which would include the 1997-99 accounting issues and the disputed future compliance issues listed by Kansas. *Id.* at 136.

Further, with respect to model calibration issues, the Special Master concluded that some changes proposed by Colorado's expert appeared to have merit, but he felt that the specific changes proposed should not be made or he did not feel confident from the evidence presented in making a decision on a technical modeling issue. *Id.* at 89, 92. He also recognized that his rulings would require changes to the model and new calibration efforts, *id.* at 124, but also noted that the Court was not in a position to direct technically how the model should be calibrated. *Id.* Thus, rather

than resolve all of the remaining issues, he recommended that experts from both states confer on certain matters to see if they could reach agreement. *Id.* at 91-92; *see also id.* at 53-54, 85-86, 88, 89. The Special Master fully recognized that there may be some modeling issues that will need to be settled in the future applications of the H-I model, *id.* at 121-23, but stated that he did not mean to imply that all of these matters will become contentious issues. *Id.* at 123. Colorado believes that in doing so, the Special Master was attempting to counsel the parties that technical modeling issues are better suited to resolution by cooperative study and expert agreement than by litigation, *id.* at 123, and that some alternative method to resolve disputes, be it through the Arkansas River Compact Administration or binding arbitration, should be considered. *Id.* at 135, 136. Colorado agrees.

Colorado recognizes that the Court has an obligation to adjudicate cases between states under the Constitution where there are actual, existing controversies. *Oklahoma v. New Mexico*, 501 U.S. 221, 241 (1991). However, the Special Master concluded that it was unnecessary to resolve the fifteen issues listed by Kansas at this time and that additional evidence will be available that might make it unnecessary to resolve them in the future. This conclusion is fully supported by the findings in the Fourth Report.

CONCLUSION

The recommendations in the Special Master's Fourth Report are fully supported by the findings and conclusions in the Report, and he correctly interpreted the Court's intent when it sustained Colorado's request to change the date for awarding prejudgment interest from 1969 to 1985.

This case should be remanded to the Special Master in accordance with his final recommendation for preparation of a final decree consistent with the Court's opinion and the recommendations in the Fourth Report.

Respectfully submitted,

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users, but to the State of Kansas. In the absence of a knowing or intentional breach of the compact, Colorado argues that the State of Kansas should not be allowed to recover all of the losses, and prejudgment interest, at rates incurred by the water users. Finally, if prejudgment interest is to be awarded, the interest rate to be used "requires careful thought." Colo. Closing Br. at 110. Kansas experts used interest rates which reflected inflation and the opportunity costs to farmers to compound the losses attributed to farmers. *Id.*; Kan. Exh. 892, Section A at 28-29, Table 12. Colorado argues that the rate of interest applicable to the State of Kansas, which is lower, should have been used instead.

C. Legal Principles Governing an Award of Prejudgment Interest.

The award of prejudgment interest is not unique. As I concluded in my Second Report, a majority of jurisdictions now reject the traditional approach which allowed prejudgment interest only under statute or on a liquidated claim. Second Report at 106-07. A recent case states that prejudgment interest is now the "norm in federal litigation"; it is an "ordinary part of any award under federal law." *Matter of Oil Spill by the Amoco Cadiz*, 954 F.2d 1279, 1331-32 (7th Cir. 1992), citing *West Virginia v. United States*, 479 U.S. 305, 310, 93 L.Ed.2d 639, 107 S.Ct. 702, 706 (1987); see also *General Motors Corp. v. Devex Corp.*, 461 U.S. 648, 655-56, 76 L.Ed.2d 211, 103 S.Ct. 2058, 2062-63 (1983); *Barbour v. Merrill*, 48 F.3d 1270, 1278-79 (D.C. Cir. 1995); *Lorenzen v. Employees Retirement Plan of Sperry & Hutchinson Co.*, 896 F.2d 228, 236 (7th Cir. 1990);

Gorenstein Enterprises, Inc. v. Quality Care-USA, Inc., 874 F.2d 431, 436-37 (7th Cir. 1989).

> A recent patent case states:
>
> " . . . neither pre- nor postjudgment interest awards are unique to patent law. Many other areas of law besides patent law, including contract, tort, insurance, admiralty, employment, securities, and civil rights, also provide for prejudgment interest awards under both statutory and common-law authority." *Transmatic, Inc. v. Gulton Industries, Inc.*, 180 F.3d 1343, 1347 (Fed.Cir. 1999).

In a footnote the Court then provides the following citations: 15 U.S.C. §§ 15(a), 15a (1994) (antitrust); 17 C.F.R. § 201.600 (1994), *reprinted in* 15 U.S.C. foll. § 78u (securities); 29 U.S.C. § 1132(a)(9) (1994) (ERISA); *City of Milwaukee v. Cement Div. Nat'l Gypsum Co.*, 515 U.S. 189, 132 L.Ed.2d 148, 115 S.Ct. 2091 (1995) (admiralty); *United States v. Texas*, 507 U.S. 529, 123 L.Ed.2d 245, 113 S.Ct. 1631 (1993) (contract); *Milwaukee Brewery Workers' Pension Plan v. Jos. Schlitz Brewing Co.*, 513 U.S. 414, 130 L.Ed.2d 932, 115 S.Ct. 981 (1995) (ERISA); *Loeffler v. Frank*, 486 U.S. 549, 100 L.Ed.2d 549, 108 S.Ct. 1965 (1988) (Title VII); *Morales v. Freund*, 163 F.3d 763 (2nd Cir. 1999) (securities); *Gierlinger v. Gleason*, 160 F.3d 858 (2nd Cir. 1998) (§ 1983); *United States v. Township of Brighton*, 153 F.3d 307 (6th Cir. 1998) (CERCLA); *Cimino v. Raymark Indus., Inc.*, 151 F.3d 297 (5th Cir. 1998) (tort); *Fratus v. Republic W. Ins. Co.*, 147 F.3d 25 (1st Cir. 1998) (insurance).

Also there is now ample authority that prejudgment interest is not an added remedy, but simply is part of providing full compensation to the injured party. *West*

Virginia v. United States, 479 U.S. 305, 310 n. 2, 93 L.Ed.2d 639, 107 S.Ct. 702 (1987) ("Prejudgment interest serves to compensate for the loss of use of money due as damages from the time the claim accrues until judgment is entered, thereby achieving full compensation for the injury those damages are intended to redress."); *Transmatic, Inc. v. Gulton Industries, Inc.*, 180 F.3d 1343 (Fed. Cir. 1999), citing *West Virginia v. United States; United States v. City of Warren, Mich.*, 138 F.3d 1083, 1096 (6th Cir. 1998) ("An award of prejudgment interest 'is an element of complete compensation' in a Title VII back pay award," citing cases); *Chandler v. Bombardier Capital, Inc.*, 44 F.3d 80, 83 (2nd Cir. 1994) ("The purpose of a prejudgment interest award in a wrongful termination case is to compensate a plaintiff for the loss of use of money that the plaintiff otherwise would have earned had he not been unjustly discharged," citing cases); *Matter of Oil Spill by the Amoco Cadiz*, 954 F.2d 1279, 1331 (7th Cir. 1992) ("Prejudgment interest is an element of complete compensation," citing *West Virginia v. U.S.* and other cases); *Northern Natural Gas Co. v. Grounds*, 393 F.Supp. 949, 991 (1974) ("The object of this phase of the litigation is to assure that just compensation be paid . . . [and] an award of prejudgment interest is required in order to assure this result.")

Prejudgment interest, as a legal matter, is intended to compensate injured parties both for the time value of the lost money as well as for the effects of inflation. *United States v. City of Warren, Mich.*, 138 F.3d 1083 (6th Cir. 1998). "Money today is not a full substitute for the same sum that should have been paid years ago." *Matter of Oil Spill by the Amoco Cadiz*, 954 F.2d 1279, 1331 (7th Cir. 1992). "Prejudgment interest, like all monetary interest, is

simply compensation for the use or forbearance of money owed." *Transmatic, Inc. v. Gulton Industries, Inc.*, 180 F.3d 1343, 1347 (Fed. Cir. 1999). "Prejudgment interest is not awarded as a penalty; it is merely an element of just compensation." *City of Milwaukee v. Cement Division, National Gypsum, Co.*, 515 U.S. 189, 197, 132 L.Ed.2d 148, 115 S.Ct. 2091 (1995).

However, prejudgment interest lies within the sound discretion of the Court. It is not to be awarded according to any rigid theory of compensation for money withheld, "but is given in response to considerations of fairness." *Jackson County v. United States*, 308 U.S. 343, 352, 84 L.Ed. 313, 60 S.Ct. 285 (1939); *United States v. City of Warren, Mich.*, 138 F.3d 1083 (6th Cir. 1998); *Matter of Oil Spill by the Amoco Cadiz*, 954 F.2d 1279, 1334 (7th Cir. 1992). There is also authority that a *denial* of prejudgment interest may be unfair, and should be justified. *City of Milwaukee v. Cement Division, National Gypsum Co.*, 515 U.S. 189, 132 L.Ed.2d 148, 115 S.Ct. 2091 (1995); *Matter of Oil Spill by the Amoco Cadiz*, 954 F.2d 1279, 1334 (7th Cir. 1992). Prejudgment interest was denied on grounds of fairness in *Jackson County v. United States*, 308 U.S. 343, 84 L.Ed. 313, 60 S.Ct. 285 (1939); *Nedd v. United Mine Workers of America*, 488 F.Supp. 1208 (1980) ("Justice requires the disallowance of interest.")

D. Considerations in this Case Affecting Prejudgment Interest.

Kansas can argue persuasively, and has done so, that the law strongly supports the inclusion of prejudgment interest as part of a damage award. Likewise, there is no

doubt that fundamental economic principles require the same result. Yet there is no case in which prejudgment interest has been awarded that is at all similar to the facts in this dispute. Indeed, even damages as a potential remedy for the violation of an interstate water compact were not recognized until 1987 in *Texas v. New Mexico*, 482 U.S. 124, 96 L.Ed.2d 105, 107 S.Ct. 2279 (1987). When Kansas filed its complaint, it sought only a decree commanding Colorado "to deliver the waters of the Arkansas River in accordance with the provisions of the Arkansas River Compact." Not until the *Texas v. New Mexico* decision was the Kansas complaint amended to include a claim for damages.

Nonetheless, looking to the law generally and apart from interstate water disputes, the cases favor the inclusion of prejudgment interest as a component of damages, unless circumstances justify otherwise. Some cases specifically articulate a presumption in favor of such inclusion. *Barbour v. Merrill*, 48 F.3d 1270, 1279 (D.C. Cir. 1995); *Gorenstein Enterprises, Inc. v. Quality Care-USA, Inc.*, 874 F.2d 431, 436 (7th Cir. 1989); *Waterside Ocean Navigation Co. v. International Navigation Ltd.*, 737 F.2d 150, 154 (2nd Cir. 1984). Prior to *City of Milwaukee v. Cement Division, National Gypsum Co.*, 515 U.S. 189, 132 L.Ed.2d 148, 115 S.Ct. 2091 (1995), the courts had developed several criteria for the exercise of their discretion if such interest were to be denied: whether laches was present; whether there was a genuine dispute over a good faith claim in a mutual fault situation; whether the plaintiff had been less than diligent in prosecuting the action, or guilty of improper delaying tactics; whether the defendant had been unjustly enriched; whether prejudgment interest

would be compensatory rather than punitive. *Reeled Tubing, Inc. v. M/V Chad G*, 794 F.2d 1026, 1028 (5th Cir. 1986); *Segal v. Gilbert Color Systems, Inc.*, 746 F.2d 78, 82-83 (1st Cir. 1984); *Noritake Co., Inc. v. M/V Hellenic Champion*, 627 F.2d 724, 728-29 n. 3 (5th Cir. 1980); *Nedd v. United Mine Workers of America*, 488 F.Supp. 1208, 1219-20 (M.D. Pa. 1980).

Milwaukee, however, dismissed the argument of a good faith dispute as having "little weight," and stated that the Court was "unmoved" by the magnitude of the plaintiff's fault in a comparative negligence situation. 515 U.S. at 197, 199. Apart from the issue of delay, the courts actually have "done little to sketch the limits of acceptable discretion" in denying prejudgment interest. *Matter of Oil Spill by the Amoco Cadiz*, 954 F.2d 1279, 1334 (7th Cir. 1992). Yet, one fundamental standard still appears to remain – that prejudgment interest is given "in response to considerations of fairness." *Jackson County v. United States*, 308 U.S. 343, 352, 84 L.Ed. 313, 60 S.Ct. 285 (1939). Likewise, the remedy in this case, taken as a whole, must be a "fair and equitable solution." *Texas v. New Mexico*, 482 U.S. 124, 134, 96 L.Ed.2d 105, 107 S.Ct. 2279 (1987).

The obvious difference between the many reported cases on prejudgment interest, and the facts at hand, is the great length of time between the first depletions of usable Stateline flow and a judgment. At least 50 years will be involved. Two cases have been found with a lag of 20 to 30 years between injury on some claims and judgment, but no longer period of time. *Wilkerson v. Ingalls Shipbuilding, Inc.*, 125 F.3d 904 (5th Cir. 1997); *Nedd v. United Mine Workers of America*, 488 F.Supp. 1208 (1980). And in each of these cases, although for reasons other

than the delay, interest was actually denied. Normally, either a statute of limitations or the application of laches would preclude a large buildup of prejudgment interest. That is not to say, however, that such interest cannot be large and exceed the basic claim. In the *Matter of Oil Spill by the Amoco Cadiz*, the Court upheld prejudgment interest of more than $120 million, accrued over 13 years, on a damage award of $61 million. 954 F.2d at 1330, 1335. And in *City of Milwaukee*, damages were $1.67 million, and prejudgment interest amounted to $5.3 million. 515 U.S. at 192. However, because prejudgment interest is an element of "full compensation," an award of such interest "no matter how large, cannot be called 'punitive.' " *Matter of Milwaukee Cheese Wisconsin, Inc.*, 112 F.3d 845, 849 (7th Cir. 1997).

Nonetheless, without some limitation, compounding even small damages over 50 years produces startling results. For example, the Kansas evidence shows additional pumping costs within the ditch service areas in 1950 amounting to only $103. Compounded to 1998, these damages become $4166. Kan. Exh. 1092, Table A18. Likewise, crop losses in 1950 amounted to only $2060 according to Kansas' evidence, but compensation sought for these losses is $83,594. Kan. Exh. 1092, Table C10. The H-I model has computed depletions in usable flow for 1950, and each year after, and Kansas turns those shortages into damages. Yet I am confident that in 1950, the first year after the compact was signed, and in the early years thereafter, no one had any thought that the compact was being violated. It was lawful in Colorado to drill wells without state permission, and Colorado farmers saw the

same kind of well development going on along the Arkansas River in Kansas.

In many of the prejudgment interest cases, the defendant has the money in hand, either wrongfully withheld or wrongfully collected from the plaintiff, and thus has the use of the money until final judgment. Prejudgment interest prevents such a defendant from profiting from the wrong. *Gore, Inc. v. Glickman*, 137 F.3d 863 (5th Cir. 1998); *Matter of Oil Spill by the Amoco Cadiz*, 954 F.2d 1279 (7th Cir. 1992). The situation here is different. The benefits of the usable flows withheld went primarily to Colorado farmers, not to the State of Colorado. Likewise, except for taxes lost to the State of Kansas and the secondary impacts to the Kansas economy, both of which are relatively small, the additional costs and crop losses were suffered by Kansas farmers, yet damages go to the state. Prejudgment interest here neither takes from those who benefitted, nor goes to those who were injured. Kansas, of course, does not see this as a meaningful distinction. For 50 years, it argues, Colorado has had the advantage of water belonging to Kansas, and should not now be allowed to gain from compact violations. That there have been gains, both to Colorado farmers and to the State of Colorado, is not in doubt. Surely that is why Colorado opposed the legal position taken by Kansas, namely, that damages be determined on the basis of gains in Colorado rather than injury to Kansas. I ruled against Kansas on this issue (see Exhibit 1 in the Appendix) but we should not be oblivious to Colorado's use of the water over this long period of years.

An interstate water compact, besides being federal law, is a contract. *Texas v. New Mexico*, 462 U.S. 554, 564,

77 L.Ed.2d 1, 103 S.Ct. 2558 (1983). Though a compact deals in water rather than money, many of the same policies calling for prejudgment interest in general contract situations also apply to interstate water disputes. The upstream state has a natural geographic advantage. It has first access to the water. It can take what it wants, leaving the downstream state to complain if the upstream use exceeds its compact share. An enforcement action by the downstream state is not only difficult and expensive, it almost always requires years to complete. Generally, a preliminary injunction is not available, and the upstream state continues to have use of water during the long trial. In many situations, the problem begins with the compact itself, which may be quite vague. The Arkansas River Compact, for example, does not allocate to Kansas either a defined quantity of water or a specific share of river flow. Rather, it calls for an "equitable" division, and only places restrictions on new Colorado water development that will cause material depletions of usable flows into Kansas. The problems of data collection are also enormous. In this case, new wells were the principal cause of the Stateline depletions. But, initially, there were no records of the number of wells, where they were located, or how much water they pumped. All of these data, and much more, had to be developed before specific determinations of well impacts could be made.

I am convinced, in general, that prejudgment interest adjusting for inflation and for the loss of use of funds owed should be included in any damage award for violation of an interstate water compact. I have difficulty, however, in recommending the full amount sought by Kansas in this case. Given the long delay here, and the

dramatic impact of compounding over so many years, fairness would seem to deny at least a portion of prejudgment interest during the early years when neither state understood that depletions were occurring. Colorado contends that it was not aware of a compact violation until at least 1984. Colo. Closing Br. at 107. I disagree. I find that by 1968 Colorado knew, or should have known, that postcompact wells were causing material depletions of usable Stateline flows. It is essentially correct that Kansas did not register a formal complaint until 1985, but that is not to say that Colorado was unaware of the impact of its postcompact pumping until that time.

Prior to 1965 Colorado had no system for the regulation of groundwater water. While surface diversions had required state permits since the 1800s, and were closely regulated on a "first in time, first in right" basis, wells could be drilled without state permission and even without the state's knowledge. Nor were any reports required of the amounts pumped. Colorado's evidence showed that some 1233 new large irrigation wells were drilled along the Arkansas River between 1949 and 1965. Colo. Exh. 165*, Table A1. Colorado's database constructed for the trial estimated that pumping in 1950 amounted to 41,458 acre-feet, and had increased to 203,925 acre-feet in 1964. *Id.*

The pressure to regulate groundwater pumping came first, not from Kansas, but from holders of downstream surface diversion rights in Colorado, and resulted in 1965 state legislation. Under this new legislation, the State Engineer was ordered to administer wells along the Arkansas River in accordance with the doctrine of prior appropriation, that is, to subordinate new wells to prior

surface diversion rights. Colo. Exh. 378. The State Engineer's first effort to enforce the new law, however, was struck down by the Colorado Supreme Court. *Fellhauer v. People*, 167 Colo. 320, 447 P.2d 986 (1968). Further legislation then resulted in a comprehensive study of both surface diversions and groundwater pumping along the Arkansas River, known as the 1968 Wheeler Report. Jt. Exh. 92. This Report, which was published at the direction of the state legislature, found that well use in recent years had "materially decreased the surface flows available to direct flow and storage rights." *Id.* at vi. The Wheeler Report and more state legislation led finally to new rules limiting pumping to three days a week, without mitigation measures to protect prior rights. Jt. Exh. 93. While these Colorado efforts were aimed at protecting downstream surface diversions in Colorado from the impacts of new and excessive pumping, Colorado had to know that the impacts on the other side of the Stateline in Kansas were no different.

During the liability phase of the trial, Colorado sought to bar Kansas from any relief, claiming that the facts concerning well development in Colorado were common knowledge by the mid-1960s, and that Kansas was guilty of laches. That contention has a double edge. Colorado is in no position now to claim that it was unaware of the problems caused by unregulated pumping until at least 1984.

With regard to the issue of fairness, Kansas itself recently argued that Kansas gas producers should not be responsible for prejudgment interest on refunds of payments that were made in reliance upon a decision of the Federal Energy Regulatory Commission that was lawful

at the time. *Anadarko Petroleum Corp. v. FERC*, 196 F.3d 1264 (D.C.Cir. 1999). Federal law established maximum prices on certain natural gas sales, but allowed an excess charge to recover state severance taxes. FERC ruled that a Kansas ad valorem tax was such a severance tax, and accordingly allowed higher prices. However, this ruling was challenged in 1983, and in 1988 the Court held that the FERC rule "fell short of reasoned decision-making." *Colorado Interstate Gas Co. v. FERC*, 850 F.2d at 769, 770 (D.C. Cir. 1988). The case was remanded to allow the Commission to show what would be required for a tax to be similar to a production or severance tax. Five years passed before FERC acted on the remand, and then the Commission simply reversed its earlier decision, and ordered repayment of all excess charges after 1988, together with interest. Interest charges amounted to 160 percent of the principal.

Kansas sought to have all producers relieved of the interest charges because: "the litigation has gone on forever;" the Commission was responsible for much of the delay; and the producers had relied upon the Commission's settled view that the Kansas ad valorem tax was a severance tax. *Anadarko Petroleum Corp. v. FERC*, 196 F.3d at 1268. The Court of Appeal was not persuaded, stating that neither the Commission's legal errors nor its "snail-like pace" were grounds for changing the producers' interest obligations. *Id.* It was the customers, ruled the Court, who had paid more than they should, and who were entitled to be made whole. Quoting *Matter of Milwaukee Cheese Wisconsin, Inc.*, the Court said: "Compensation deferred is compensation reduced by the time value of money." *Id.* at 1267.

The general lack of knowledge in the early years about pumping in Colorado and its impacts along the Arkansas River served to protect Kansas during the liability phase of the case against a claim of laches. The same degree of fairness, I believe, should now relieve Colorado of the obligation to pay full interest rates on damages from depletions during 1950-68 period, which now only with hindsight and the benefit of sophisticated computer modeling can be found to have occurred.

Kansas argues that Colorado's awareness, or lack of awareness, of compact violations during the early years should have no bearing here. They contend that Colorado's knowledge would be a consideration only if prejudgment interest were part of a punitive damage award rather than an element of compensatory damages. As a policy issue, they also say that compact compliance is hardly encouraged if an upstream state is better off the less it knows. But Kansas fails to acknowledge that it too was involved. Neither state in the early years saw any wrongdoing, or thought that Kansas was not receiving its compact share of usable flows of the Arkansas River. Under these circumstances, it does not now seem fair to impose compound interest rates for that period of time.

There is, however, another consideration in the award of prejudgment interest during these early years. Three elements can be involved in any such award: an interest rate to reflect the loss of use of money owed; a rate to reflect inflation; and a risk factor, although that is not applicable here. Denial of "prejudgment interest" during the 1950-68 period would ordinarily mean that only "nominal" damages would be recovered, that is, only the actual dollar values at the time of the loss. But

here, Colorado itself states that a "fair and equitable remedy" would adjust all damages for inflation. Colo. Closing Br. at 110. Also, Colorado's chief expert Professor Wichelns, speaking as an economist, testified to the need to adjust past values to account for inflation. RT Vol. 199 at 19. Given the Colorado position, I thus recommend that actual damages for the period 1950-68 should be adjusted for inflation, but should not bear compound interest reflecting the loss of use of those monies.

E. Conclusion.

Kansas' damages, as determined in earlier Sections of this Report, should include prejudgment interest at rates proposed by Kansas, but only from 1969 to the date of judgment. These rates properly include inflation and the loss of use of money due as damages. Damages incurred during the 1950-68 period should be adjusted for inflation only using rates proposed by Kansas.

(36)

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Supreme Court of the United States

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO

On Exceptions To The Fourth Report Of The Special Master

MOTION FOR LEAVE TO FILE SUR-REPLY AND KANSAS' SUR-REPLY TO THE UNITED STATES

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MOTION FOR LEAVE TO FILE SUR-REPLY TO THE UNITED STATES

Comes now the State of Kansas and files this Motion for Leave to File the attached Kansas' Sur-Reply to the United States. The grounds for this Motion are as follows:

1. On December 8, 2003, the Court received, and ordered filed, the Fourth Report of the Special Master. The Court additionally ordered that "[e]xceptions to the Report, with supporting briefs, may be filed within 45 days," and that "[r]eplies, if any, with supporting briefs, may be filed within 30 days."

2. On January 22, 2004, Kansas filed Exceptions and a supporting Brief. Replies would have been due on February 23, 2004, but, at the request of the United States, an extension of time until and including March 22, 2004 was granted. See Clerk's Letter of February 11, 2004.

3. The Brief for the United States in Opposition to the Exceptions of Kansas (Brief for the United States or U.S. Brief) was filed on March 22, 2004.

4. The United States, although a party to this action, did not participate in the proceedings before the Special Master that formed the basis for Kansas' Exceptions to the Fourth Report.

5. Kansas has had no previous opportunity to address the newly announced positions of the United States on the subjects addressed in the Brief for the United States.

6. The United States has no objection to this Motion.

WHEREFORE, the State of Kansas moves for leave to file the attached Kansas' Sur-Reply to the United States.

Respectfully submitted,

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I. STATEMENT

The Special Master has submitted his Fourth Report in this proceeding. Kansas has submitted six Exceptions to the Fourth Report with its Brief in Support (Kan. Brief). Colorado and the United States have filed replies to some or all of the Kansas Exceptions. This Sur-Reply responds to the Brief for the United States in Opposition to the Exceptions of Kansas (Brief for the United States or U.S. Brief).

Although the United States is a party, it has not participated for the most part in proceedings before the Special Master since the issues potentially affecting federal agencies were disposed of in 1995. See *Kansas v. Colorado*, 514 U.S. 673 (1995); Second Report of Special Master 4 (1997). Although no federal agency will be affected by the Court's rulings on Kansas' Exceptions to the Fourth Report, the United States has nevertheless asserted "a significant institutional interest in the proper administration and enforcement of interstate compacts," and has opposed two of Kansas' Exceptions. U.S. Brief 10.

The two issues addressed in the Brief for the United States are (1) whether an expert river master should be appointed to administer the final decree regarding Colorado's continued postcompact well pumping, and (2) whether Kansas is entitled to prejudgment interest beginning to accrue in 1985 on damages incurred before 1985 as a result of Colorado's violations of the Arkansas River Compact (Compact). In this Sur-Reply, the State of Kansas examines the validity of the positions of the United States on these two issues.

II. SUMMARY OF ARGUMENT

A. River Master

The State of Kansas has proposed that the decree in this case be implemented by a Pecos-style river master in light of Colorado's insistence on continued postcompact pumping and the consequent need to determine depletions and credits each year to measure Compact compliance. Thus, following closely the example of *Texas v. New Mexico*, 482 U.S. 124 (1987), Kansas has recommended appointment of an expert river master whose duties will be limited as the Court deems appropriate and whose determinations will be subject to clearly erroneous review by the Court. The United States fails to acknowledge the success of the Pecos River Master. Rather, the United States asserts a number of concerns of a theoretical nature that were not concerns of the Court when it instituted the Pecos River Master in 1987 and which have not proven to be practical concerns during the 16 years of the Pecos River Master's existence.

The United States makes the questionable and unsupported assertion that appointment of an independent, expert river master would actually promote adversarial confrontations. This assertion challenges fundamental notions that underlie this Court's original jurisdiction and the success of the Pecos River Master in minimizing further litigation.

The counterproposal of the United States is to refer such disputes as may arise in the implementation of this Court's decree to the Arkansas River Compact Administration. The States and Congress, however, did not create the Administration to implement a litigated decree of this Court. To accept this recommendation would be to upend

the teaching of the Court's precedents and to encourage unnecessary resort to this Court's original jurisdiction.

B. Prejudgment Interest

The Court's Opinion of June 11, 2001, set out a bright-line rule that could be readily applied in other interstate cases, subject to the Court's discretion to balance the equities in a particular case. The United States would supplant the Court's bright-line rule with a vague standard that would be difficult to administer in future cases. It would also depart from the Court's reasoning in the cases on which the Court relied to reach its decision in this case. In those cases, interest was applied to the amount of damages owing at the time accrual of prejudgment interest was to begin. The United States opposes such application of prejudgment interest in this case.

The United States' position would violate the principle at the root of the rule announced in the Court's Opinion, namely, that the value of Kansas' claim in the year in which suit was commenced would be preserved against diminution during the pendency of the litigation. In contrast, the United States' standard would ensure the diminution of the value of the claim during the pendency of the litigation and provide an incentive for the defendant State to prolong the litigation. Prefiling damages, the lion's share of damages in this case, would be interest-free, which would insulate from interest the very damages that motivated the initiation of this litigation. If there had been no post-1984 damages in this case, there would be no prejudgment interest awarded at all under the United States' formulation.

The United States also focuses in part on the specific amount of an interest award and implies that the principles endorsed by the Court in fashioning an award should be driven by the dollar amount involved and not vice versa. Finally, the United States erroneously suggests that Kansas acquiesced in the accounting that underpins the United States' position. This is an unfair suggestion, given Kansas' unfailing support of a complete award of prejudgment interest through and until the time of the Court's ruling that interest should begin to accrue in the year in which the case was filed.

III. ARGUMENT

A. Appointment of an Expert River Master Whose Decisions Would Be Subject to Clearly Erroneous Review Constitutes the Most Efficient Way to Conclude this Litigation.

The Special Master and the State of Kansas agree that expeditious resolution of this litigation is needed. See Fourth Report of the Special Master 136. The United States also seems to share this view. See U.S. Brief 14 (quoting Fourth Report 136). The Special Master and the State of Kansas further agree that appropriate resolution of this litigation must include a means to assure that Kansas will be reasonably protected from further violations of the Arkansas River Compact as a result of the continuation of postcompact well pumping in Colorado. See *id.*, at 121 ("One of the most vexing issues left to be decided in this case is how to reasonably assure that Colorado will continue to meet its compact obligations"). However, the United States opposes the appointment of an expert river master, arguing that such an appointment would prolong the litigation. Kansas believes that such an

appointment, with appropriate limitations and standard of review, would greatly reduce the likelihood of further litigation.

1. The Arkansas River Compact Administration Is Not a Viable Alternative to a River Master.

The United States argues that the "appointment of a river master is neither desirable nor necessary because there is an available and preferable alternative," namely, the Arkansas River Compact Administration (Administration). U.S. Brief 14-15. The United States fails to acknowledge, however, that it was because of the structural inability of the Administration to resolve disputes related to postcompact well pumping and Compact compliance that this case was filed in the first place. See, *e.g.*, *Kansas v. Colorado*, 514 U.S. 673, 689 (1995) ("As late as 1985, Colorado officials refused to permit an investigation by the Administration of well development in Colorado"); Kansas Brief in Support of Motion for Leave to File Complaint 8-9. Moreover, Colorado's primary argument against the Motion for Leave to File Complaint in this case was that Kansas had "an adequate means for vindicating its concerns through a pending investigation by the Administration." Colorado's Brief in Opposition to Motion for Leave to File Complaint 1. The Court implicitly rejected the Administration as a viable alternative for determining the issues in this proceeding by granting Kansas leave to file its complaint. See *Kansas v. Colorado*, 475 U.S. 1079 (1986) (order granting motion for leave to file complaint). The Administration is no more able to protect the interests of Kansas today than it was when this litigation began 18 years ago.

The United States argues that "[t]he Administration is the appropriate body to resolve complex technical issues respecting the computer model that will be used to measure Colorado's compliance with its Compact obligations." U.S. Brief 10-11. This statement disregards the limitations, both procedural and technical, placed on the Administration by the States and Congress. Simply put, *the Administration cannot resolve any issue on which the States disagree*. This fundamental limitation is at the heart of the intent of the States and of Congress in their approval of the Arkansas River Compact. See Arkansas River Compact (63 Stat. 145 (1949)), Art. VIII-D, App. to Kan. Brief 12 ("Each State shall have but one vote in the Administration and every decision, authorization or other action shall require unanimous vote").

Although the Administration can sometimes provide a convenient forum for the States to discuss issues on which they can come to agreement, the Administration is an unworkable forum in which to resolve issues on which the States cannot agree. The Court has consistently declined to refer compact enforcement issues to a body that can act only with the cooperation of all the States. See *Green v. Biddle*, 8 Wheat. 1, 90-91 (1823); *Texas v. New Mexico*, 482 U.S. 124, 133 (1987) ("That [allocation] formula was fashioned in the course of this litigation, which was occasioned by the inability of the Pecos River Commission, on which Texas and New Mexico have the only votes, to agree on how river water should be divided"); *Oklahoma v. New Mexico,* 501 U.S. 221, 240-241 (1991).

Further, even if the Administration were able to resolve disputes, it has little inherent expertise to "resolve complex, technical issues." U.S. Brief 14. Two thirds of the members of the Administration are water users, not

technical engineering or computer modeling experts. See Arkansas River Compact, Art. VIII-C, App. to Kan. Brief 12. The Administration has no technical staff, independent or otherwise. To the extent that technical engineering or hydrologic issues become relevant to the Administration's activities, the Administration simply relies on technical experts of the States or the Federal Government. See, *e.g.*, Arkansas River Compact, Art. VIII-G, App. to Kan. Brief 14.

As demonstrated above, the Arkansas River Compact Administration is not equipped to resolve disputed issues such as those that the United States would have it resolve. Its inability to make decisions on disputed issues and its overall lack of technical expertise make the Administration an unworkable forum to resolve issues arising under the decree in this case.

2. Contrary to the Assertion by the United States, Appointment of a River Master Can Be Expected to Minimize Further Litigation on the Arkansas River.

The United States makes the unsupported assertion that appointment of a river master to resolve disputes between the States under the decree in this case "would likely promote continued adversarial proceedings and prolong this litigation." U.S. Brief 11. The State of Kansas believes otherwise. In Kansas' view, the presence of a court-appointed river master to resolve disputes under the decree would promote settlement of such disputes and minimize further litigation, particularly because an expert river master would be well-suited to resolve complex technical issues.

The Court itself has expressed views that appear to be closer to those of Kansas than of the United States in this case. In *Rhode Island v. Massachusetts*, 12 Pet. 657 (1838), the State of Rhode Island sought resolution of a boundary dispute with Massachusetts. Daniel Webster filed a motion to dismiss the suit for want of jurisdiction. The Court denied the motion. In the course of discussing compacts adopted under the Compact Clause of the Constitution, the Court stated, "Few [compacts], if any, will be made, when it is left to the pleasure of the State in possession; but when it is known that some tribunal can decide on the right, it is most probable that controversies will be settled by compact." *Id.*, at 726 (quoted in *Kansas v. Colorado*, 185 U.S. 125, 144 (1902) (overruling Colorado's demurrer to Kansas' suit for apportionment of the Arkansas River)); accord, *Texas v. New Mexico*, 462 U.S. 554, 569 (1983). Likewise, when it is known that a river master can decide issues arising under the decree in this case, it is most probable that controversies will be settled by agreement, thus minimizing proceedings before the river master and proceedings directly before this Court.[1]

In this context, Colorado is the State "in possession" of the resource and, as the Court suggested in *Rhode Island v.*

[1] The United States asserts that it has encouraged the use of alternative means of dispute resolution in original actions "as a means to diffuse or resolve interstate disputes that might otherwise lead to motions for leave to invoke this Court's original jurisdiction." U.S. Brief 17 n.4. Actually, in both cases cited by the United States, motions for leave to invoke this Court's original jurisdiction were filed. See *Nebraska v. Wyoming*, No. 108, Orig., 479 U.S. 1051 (1987); *Kansas v. Nebraska*, No. 126, Orig., 525 U.S. 1101 (1999). It was only after this Court had accepted the cases and had made preliminary rulings that it was possible to resolve those interstate disputes.

Massachusetts, few agreements on disputed issues, if any, will be made when it is left to the pleasure of the State in possession. The Court discussed this issue explicitly in the Pecos River litigation:

> "[I]f all questions under the Compact had to be decided by the Commission in the first instance, New Mexico could indefinitely prevent authoritative Commission action, solely by exercising its veto on the Commission. As New Mexico is the upstream State, with effective power to deny water altogether to Texas except under extreme flood conditions, the Commission's failure to take action to enforce New Mexico's obligations under Art. III(a) would invariably work to New Mexico's benefit." *Texas v. New Mexico*, 462 U.S. 554, 568-569 (1983).

Of course, Kansas retains its right to seek relief in this Court under such circumstances, as the Court held in that case, but the purpose of utilizing an expert river master, whose decisions are subject to clearly erroneous review by the Court, is to minimize the need to resort to this Court's original jurisdiction. Indeed, a concern identified by the Court in *Texas v. New Mexico* was the likelihood of repeated original actions if a river master were not appointed. See 482 U.S. 124, 134 ("Absent some disinterested authority to make determinations binding on the parties, we could anticipate a series of original actions to determine the periodic division of the water flowing in the Pecos").

The Court has earlier emphasized the need to utilize its original jurisdiction sparingly. *Mississippi v. Louisiana*, 506 U.S. 73, 76-77 (1992); *Nebraska v. Wyoming*, 515 U.S. 1, 8 (1995). Nevertheless, if disputes arise between Kansas and Colorado over the implementation of the decree in this

case, only this Court has jurisdiction to resolve those disputes. See, *e.g.*, *Mississippi v. Louisiana*, 506 U.S. 73, 77-78 (1992).

The United States fails to acknowledge that the expert Pecos River Master has functioned well and required little, if any, of the Court's time. In the 16 years since the appointment of the Pecos River Master, only once has review even been sought of his decisions. See *Texas v. New Mexico*, 485 U.S. 388, 394 (1988); 502 U.S. 803 (1991). Further, no new original jurisdiction litigation has been initiated, nor has either State sought to reopen the decree. In addition, only written submissions, for the most part, appear to have been employed by the Pecos River Master, with little apparent need for hearings. See App. to Kan. Brief 50-85. Thus, the Pecos River Master has proved to be an efficient and effective means for implementing the Amended Decree in *Texas v. New Mexico* and avoiding further original jurisdiction litigation on the issues covered by that decree.

On the Delaware River, the appointment of a Supreme Court river master has been followed by the adoption of the Delaware River Basin Compact, which incorporates the Court's Decree and provides for coordination between the Delaware River Basin Commission and the Court's River Master in the management of the Delaware River. See Delaware River Basin Compact, 75 Stat. 688 (1961). This and the Pecos River experience refute the United States' assertion that appointment of a river master on the Arkansas River can be expected to "promote continued adversarial proceedings and prolong this litigation." U.S. Brief 11. In fact, the opposite is much more likely.

3. Contrary to the Assertion by the United States, All of the Court's Precedents Support Appointment of an Expert River Master in this Case.

The United States asserts that "the Court has rejected the appointment of a river master or similar agent in" four cases. U.S. Brief 13 n.3. That assertion is open to considerable question in three of those cases, and all four cases support appointment of an expert river master in this case.

In *Vermont v. New York*, 417 U.S. 270 (1974), Vermont claimed that New York and International Paper Co. were "responsible for a sludge bed in Lake Champlain and Ticonderoga Creek that [had] polluted the water, impeded navigation, and constituted a public nuisance." *Ibid.* With the approval of the Special Master, the States had negotiated a settlement that hinged upon the entry of a proposed consent decree by the Court. The consent decree would install a "South Lake Master" with "all the usual powers of Special Masters named by [the Court]," and the mandate to "resolve matters of controversy between the parties after they [had] exhausted all administrative and other remedies (except judicial review)." *Id.*, at 270-71. In refusing to enter the consent decree, the Court noted that:

> *"[N]o findings of fact have been made; nor has any ruling been resolved concerning [the] equitable apportionment of the water involved* . . . The proposed South Lake Master would police the execution of the settlement set forth in the Decree and pass on to this Court his proposed resolution of contested issues that the future might bring forth. Such a procedure would materially change the function of the Court in these interstate contests. Insofar as we would be supervising the

> execution of the Consent Decree, we would be acting more in an arbitral rather than a judicial manner." *Id.*, at 276-77 (emphasis added).

The Court contrasted the case before it with *New Jersey v. New York*, 347 U.S. 995 (1954), where a river master was appointed on the Delaware River:

> "In that case (1) the rights of the parties to the water had been determined by the Court and (2) the sewage and industrial waste problems had been adjudicated and resolved. All that remained was to supervise the application of the various formulae which the Court had decreed, based on findings of fact." *Vermont*, 417 U.S., at 275-76.

In this case, the vast majority of issues have been litigated, there have been numerous findings of fact, there has been a quantification of the apportionment of water pursuant to the Arkansas River Compact, and there is a model by which Colorado's compliance is proposed to be measured. All that remains is for the Court to enter a decree and "supervise the application of the various formulae," *id.*, at 275-76, which was precisely the situation on the Delaware, see *ibid.*, and on the Pecos, see *Texas v. New Mexico*, 482 U.S. 124, 134 (1987). As the Special Master has acknowledged, this case is "remarkabl[y]" similar to *Texas v. New Mexico*. Fourth Report 125.

Moreover, by their settlement, Vermont and New York were asking the Court to exceed its Article III powers. *Vermont v. New York*, 417 U.S., at 277. The appointment of a river master in this case would not cause the Court to exceed its Article III powers. See *Texas v. New Mexico*, 482 U.S. 124, 134 (1987) ("[W]e are quite sure that our jurisdiction over original actions like this provides us with ample authority to appoint a river master and to enforce our judgment"). Nor is the Special Master, Colorado, or the

United States claiming that such an appointment would exceed the Court's Article III powers.

In addition to the important differences between this case and *Vermont* noted above, the Special Master's and the United States' reliance on *Vermont* leads to a skewed view of earlier Supreme Court precedents. Following the *per curiam* Opinion in *Vermont*, the Special Master and the United States cite *Wisconsin v. Illinois*, 281 U.S. 179 (1930), *New Jersey v. New York*, 283 U.S. 805 (1931), and *Wyoming v. Colorado*, 298 U.S. 573 (1936) as instances where the Court has refused to appoint a river master or "similar agent." See Fourth Report 130-131; U.S. Brief 13 n.3. But an examination of those cases shows that they were not, in fact, such instances.

In *Wisconsin v. Illinois*, 281 U.S. 179 (1930) the Court, responding to alternative proposals by Special Master Charles Evans Hughes, chose to require the filing of semi-annual progress reports directly with the Court instead of appointing a commission to supervise the gradual reduction in water diversion by the City of Chicago. *Id.*, at 198. The Court chose between two options, both of which provided for the Court to retain jurisdiction to supervise implementation of its decree. The alternative chosen by the Court actually required more direct attention by the Court than a commission would have. The Court recognized this in *Texas v. New Mexico*, 482 U.S. 124 (1987), a post-*Vermont* decision, by citing *Wisconsin* to support the proposition that a solution involving a river master, "or a like one, has been employed when the occasion demands." *Texas v. New Mexico*, 482 U.S., at 134.

In *New Jersey v. New York*, 283 U.S. 805 (1931), the Court allowed the City of New York to divert 440 million

gallons of water per day (mgd) from the Delaware River, subject to a minimum streamflow requirement and the rights of the other States to conduct inspections. *Id.*, at 805-806. In that initial decree, the Court denied without prejudice a request for the appointment of a river master, but the Court retained jurisdiction and provided that any of the parties might apply at the foot of the decree for further relief. *Id.*, at 807.

Twenty-three years later, the Court issued a new decree approving an increase in diversions by the City of New York to 800 mgd after the completion of certain reservoirs, subject to certain conditions and obligations, and authorized diversion of 100 mgd by New Jersey, also subject to certain conditions and obligations. Again, the Court retained jurisdiction, but this time a river master was also appointed. *New Jersey v. New York*, 347 U.S. 995 (1954).

The Delaware River Master was given certain general duties and certain specific duties, including administering the decree "so as to have [its] provisions . . . carried out with the greatest possible accuracy." *Id.*, at 1002. The specific duties include daily computations of streamflows adjusted to what they would have been absent the effects of upstream water operations and the directing of required daily releases from reservoirs. *Id.*, at 1003-1004. The Decree requires the River Master to make periodic quantifications on the basis of "observation and estimates" without specifying any formulas or methodologies. *Id.*, at 1003-1004. Thus, the *New Jersey v. New York* Delaware River litigation demonstrates that the Court has found it appropriate to appoint a river master where there are recurring requirements for hydrologic calculations and

estimates, as there will be under the Arkansas River Decree.[2]

Finally, the United States asserts that in *Wyoming v. Colorado*, 298 U.S. 573 (1936), the Court "rejected the appointment of a river master or similar agent." U.S. Brief 13 n.3. On the contrary, in *Wyoming*, the Court merely denied Wyoming's request to install Wyoming measuring devices at points of diversion inside Colorado. 298 U.S., at 585-86. There is no mention during the Court's discussion of the issue, or elsewhere in the Opinion, of a request for the appointment of a river master. In a later *Wyoming v. Colorado* Opinion, the Court referred to the issue of measuring devices:

> "With respect to the request for an order permitting Wyoming to install measuring devices for the purpose of determining the amount of water diverted in Colorado, the Court recognized that the problem of measuring and recording the diversions was a difficult one and the hope was expressed that the two States by cooperative efforts would find a satisfactory solution. Leave was granted to Wyoming to make a later application if the States were unable to agree. It seems that measuring devices have been installed." *Wyoming v. Colorado*, 309 U.S. 572, 578-79 (1940) (citations omitted).

Again, nowhere in the Opinion does the Court mention the appointment of a river master or the rejection of a request therefor. Instead, the Court had offered direct recourse to

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[2] This was also the situation in *Texas v. New Mexico*, 482 U.S. 124 (1987), as discussed below.

the Court if agreement could not be reached, the opposite of what the United States is suggesting here. And, with direct recourse to the Court available, the States, not surprisingly, reached agreement.

As shown above, a careful reading of the cases cited in opposition by the United States shows that they are not contrary to the appointment of an expert river master in this case, but, instead, affirmatively support such an appointment.

4. This is One of Those Occasions on Which the Court Should Appoint a River Master to Implement Its Decree.

The United States acknowledges that the Court, "on rare occasions, has appointed a river master to administer interstate water rights decrees." U.S. Brief 10. As the Court has stated: "In exercising this power [to appoint a river master], we have taken a distinctly jaundiced view of appointing an agent or functionary to implement our decrees . . . But . . . that solution, or a like one, has been employed when the occasion demands." *Texas v. New Mexico*, 482 U.S. 124, 134 (1987) (citations omitted). The Pecos litigation was clearly one of those occasions. This litigation is another.

The United States, in its discussion of the appointment of the Pecos River Master, properly focuses on the key considerations identified by the Court as being the "natural propensity of these two States to disagree if an allocation formula leaves room to do so" and the prospect of "a series of original actions to determine the periodic division of water." U.S. Brief 13 (quoting *Texas v. New Mexico*, 482 U.S., at 134).

Determining whether there is a "natural propensity of these two States to disagree" is necessarily one of judgment, but one can look to certain indices of disagreement that can provide some guidance. For instance, there has been more litigation on the Arkansas River between Kansas and Colorado than on the Pecos River between Texas and New Mexico. It was a concurrent resolution of the Kansas Legislature in 1901 that resulted in the Kansas Attorney General's initiating litigation that same year against Colorado, which led to the articulation of the Court's authority and principles for allocating the waters of interstate rivers between States. See 1901 Kan. Sess. Laws 766; *Kansas v. Colorado*, 185 U.S. 125 (1902). That litigation, brought under the Court's original jurisdiction, ended with the Court's decision in *Kansas v. Colorado*, 206 U.S. 46 (1907). Shortly thereafter, however, further litigation arose between Kansas and Colorado water users in the Federal District Court for Colorado, which led, in turn, in 1928, to the filing of further original litigation in this Court, which lasted almost 16 years. See *Colorado v. Kansas*, 320 U.S. 383, 387-388 (1943).

The Arkansas River Compact was thereafter negotiated and approved by Congress in 1949. 63 Stat. 145 (1949). Based on Compact violations beginning in 1950, this litigation was filed in 1985.[3] "Despite the diligence of the parties and the Special Master," *Kansas v. Colorado*, 533 U.S. 1, 16 (2001), and despite the initiation and settlement of another interstate water dispute involving

[3] Compact violations by Colorado have been determined in this litigation to have occurred in the years 1950-1984 and 1986-1996. App. to Third Report 64, 86 (col. g).

these two States in a different basin, see *Kansas v. Nebraska*, 525 U.S. 1101 (1999) (order granting leave to file bill of complaint); 538 U.S. 720 (2003) (decree approving settlement), this case has continued unabated and unsettled. See App. to Fourth Report 23-26 (joint report of the States re failure to settle despite best efforts of the Attorneys General). Thus, the disputes between these two States over the Arkansas River have been on the original docket of this Court some forty years since 1900.

By contrast, the first interstate litigation on the Pecos was initiated in this Court in 1974. See *Texas v. New Mexico,* 462 U.S. 554, 557-562 (1983). That litigation ended with the appointment of the Pecos River Master in 1988. *Texas v. New Mexico*, 485 U.S. 388 (1988). The fourteen years of litigation on the Pecos in the original jurisdiction thus constitute approximately one third of the time consumed in original litigation on the Arkansas. Further, impasse has arisen on the Arkansas River Compact Administration, just as it did on the Pecos River Commission. See *Kansas v. Colorado,* 514 U.S. 673, 689 (1995); *Texas v. New Mexico,* 462 U.S. 554, 560-562 (1983). Thus, the propensity for the two States in this case to disagree would appear to be at least as great as in *Texas v. New Mexico*.

The United States does not dispute that the allocation formula in this case leaves room for the two States to disagree. In fact, it emphasizes the complex nature of the computer modeling issues that will need to be resolved in order to implement the Hydrologic-Institutional Model (H-I Model) or change it. The United States argues that "the task of modeling the Arkansas River Basin is extraordinarily complex," and therefore, "appointment of a river

master is not appropriate in the circumstances presented here." U.S. Brief 12.

On the contrary, the Court's precedents would suggest that the greater the complexity of implementation, the greater the need for a river master. See discussion of *New Jersey v. New York, supra,* at 13-15. The Court has not found arguments based on the complexity of enforcement issues sufficient to dissuade it from addressing those issues directly. In response to the suggestion that the Court was embarking upon an enterprise involving administrative functions beyond its province in apportioning the waters of an interstate river, the Court has stated, "The difficulties of drafting and enforcing a decree are no justification for us to refuse to perform the important function entrusted to us by the Constitution." *Nebraska v. Wyoming*, 325 U.S. 589, 616 (1945). And if such issues are not referred to an expert river master, then they remain for direct resolution by the Court itself.

The United States also appears to draw a distinction between the H-I Model, which has been used in this case by the Special Master to determine Compact compliance, and the "formula" for apportioning the Pecos River's flows in *Texas v. New Mexico*. See U.S. Brief 13. It is undoubtedly true that there have been advances in the sophistication and accuracy of hydrologic analysis through the use of, *inter alia*, computer models, since *Texas v. New Mexico*. That increase in sophistication and accuracy, however, does not change the fundamental fact that both methods for allocation are essentially formulas. With the advent of computers, it is now more convenient and practical to handle complex calculations that represent hydrologic phenomena more completely and accurately than in earlier decades.

If the scope of responsibility of a river master as set by the Court in this case is essentially the same as the scope of responsibility for the Court's Pecos River Master, the greater part of the river master's duties will be to resolve recurring disputed data and modeling issues. See Kan. Brief 10-11. There will also be occasions where a State might propose a change in the H-I Model associated with operational changes in Colorado that would go beyond the yearly implementation issues. There is no reason to believe that this will challenge the capabilities of an expert river master such as Kansas has proposed. The Pecos River Master is Neil S. Grigg, who is a Professor of Civil Engineering at Colorado State University. See *Texas v. New Mexico*, 485 U.S. 388, 394 (1988) (order appointing river master); Tr. Vol. 168 at 51. It is an inherent part of Kansas' proposal, and the basis for proposing clearly erroneous review by the Court, that the river master on the Arkansas River also have technical expertise of a similar degree.

The clearly erroneous standard of review has worked well on the Pecos River, neither requiring significant time on the part of the Court, nor allowing the river master "largely unreviewable discretion." See U.S. Brief 14. Thus, the United States' concerns create a false issue that has not proven to be a problem on the Pecos River. There is no reason to believe that it would prove to be a problem on the Arkansas River.

In view of the foregoing, it would seem wise for the Court to appoint a river master with technical expertise and clearly specified duties, whose decisions would be subject to clearly erroneous review, instead of explicitly or implicitly inviting the parties to return directly to the Court with decree implementation issues in this case.

B. Kansas Should Be Entitled, Given the Prior Balancing of Equities By the Court, to Prejudgment Interest From 1985 on All Damages.

Kansas understands the Court's Opinion of June 11, 2001, to award prejudgment interest beginning in 1985 on the damages then owing. The Court identified Kansas' filing of this action as the event triggering the accrual of interest in this case. *Kansas v. Colorado*, 533 U.S. 1, 15-16 (2001). This determination implies that interest should accrue on the damages arising out of Kansas' then-existing claims because it is those claims, and not such claims as might later arise, of which Colorado then had notice. See *ibid.*

The United States does not share this understanding of the Court's Opinion. The United States focuses on the methodology for calculating prejudgment interest as the States implemented it pursuant to the Special Master's requirements *before* this Court issued its Opinion (incorrectly suggesting that Kansas accepted that methodology). In the United States' view, the Court did not intend to alter that methodology when it decided that interest should begin to accrue only after Colorado had notice of Kansas' claims. U.S. Brief 21 ("[W]hen this Court determined that prejudgment interest would commence in 1985, rather than in 1969, the Court did not intend to change the method by which the States had determined to calculate the interest award."). Rather, the United States argues, the Court envisioned a specific amount of damages to be awarded, and the Court's determination that interest should begin accruing in 1985 did not reflect a sentiment to award more interest than that generated by the prior methodology. *Ibid.* (citing App. to Fourth Report 14).

Kansas disagrees with the United States' assumption that the Court had in mind a specific damages figure to which Kansas should be limited. The Court's determination that interest should begin accruing in 1985 surely signifies more than some dollar figure that the Court envisioned for Kansas' damages award. It signifies, if nothing else, that once litigation is initiated and a defendant State is put on notice of the plaintiff State's claims, the defendant State should not be exempt from interest on the damages arising out of those claims. In this case the Court ruled that interest should not accrue before Kansas' filing of suit due to "the uncertainty over the scope of damages that prevailed" until that time and the fact that only Kansas had the power to begin the process of quantifying those damages. 533 U.S., at 16. But when Kansas did begin that process and removed any remaining uncertainty about the claims it was asserting, there was no longer any reason to exempt Colorado from the accrual of interest on Kansas' claims. The prior methodology for calculating interest would exempt Colorado from interest on all damages arising out of claims existing at the time of filing of the complaint. Interest would accrue only on damages arising thereafter. Indeed, if Kansas had incurred no additional damages after the filing of suit, the Court's award of interest would have been meaningless. There is nothing in the Court's Opinion to support such a result.

Arguing that the Opinion does reflect an intention to exempt from the accrual of interest all damages existing as of the filing of suit, the United States cites the "unique history and equities" of this original action; it would distinguish the Court's awards of interest in original actions from principles guiding such awards in cases

outside the Court's original jurisdiction. U.S. Brief 21-22. The United States emphasizes that the Court awarded interest as an exercise of discretion rather than on the basis of "a 'rigid theory of compensation for money withheld.'" *Id.*, at 22 (quoting *Kansas v. Colorado*, 533 U.S., at 15).

Kansas agrees that the Court's decision to award interest was and is discretionary. But the discretionary nature of the decision is no indication that the Court intended to exempt Colorado from interest on the damages existing at the time this action was filed. To say that a decision is discretionary is not to say that it should be undertaken without the guidance of neutral principles. See, *e.g.*, *Albermarle Paper Co. v. Moody*, 422 U.S. 405, 416 (1975) ("[D]iscretionary choices are not left to a court's 'inclination, but to its judgment; and its judgment is to be guided by sound legal principles'") (quoting *United States v. Burr*, 25 F. Cas. 30, 35 (No. 14,692d) (C.C.D. Va. 1807) (Marshall, C.J.)); *Brown v. Allen*, 344 U.S. 443, 496 (1953) ("We must not invite the exercise of judicial impressionism. Discretion there may be, but 'methodized by analogy, disciplined by system.' . . . Discretion without a criterion for its exercise is authorization of arbitrariness") (Frankfurter, J.) (quoting CARDOZO, THE NATURE OF THE JUDICIAL PROCESS 139, 141 (1921)). In this original action, in particular, the precedents that the Court cited in deciding to award interest are exclusively from outside its original jurisdiction. See *Kansas v. Colorado*, 533 U.S., at 10-15. Those same precedents compel the conclusion that prejudgment interest should accrue on damages owing at the time an action is filed rather than only on such new damages as the plaintiff may incur while the action is pending. See Kan. Brief 29 (citing cases).

The United States argues that it is fair to exempt all damages incurred as of the filing of suit from interest reflecting lost investment opportunities. U.S. Brief 22. It points to "the uncertainties attending the availability of money damages and prejudgment interest as a remedy for violation of an interstate compact at the time the Arkansas River Compact was negotiated." *Ibid.* (citing opinion of O'Connor, J., concurring in part and dissenting in part).

A majority of the Court has ruled, however, that, despite uncertainties about whether interest would be imposed *as a matter of course*, Colorado had notice when it signed the Compact that interest could be awarded as part of an equitable remedy: "[W]e are confident that, when it signed the Compact, Colorado was on notice that it might be subject to prejudgment interest if such interest was necessary to fashion an equitable remedy . . . . " *Kansas v. Colorado*, 533 U.S., at 14; accord, *Texas v. New Mexico*, 482 U.S. 124, 130 (1987) (holding that Court could award money damages for breach of Pecos River Compact despite "the lack of specific provision for a remedy in case of breach"). The equitable considerations that justified deferring the accrual of interest to the time of suit conversely justify an award of interest on the damages then owing. Colorado had indisputable knowledge of Kansas' claims by that time, and the process of adjudicating those claims was underway. An award of interest on the damages then owing is consistent with – and, indeed, necessary to – the equitable remedy that the Court has fashioned for Colorado's breach of the Compact.

IV. CONCLUSION

The Exceptions of the State of Kansas to the Fourth Report of the Special Master that have been challenged by the United States should be sustained.

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